

MOTOR AGE

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MOTOR AGE, October, 1936

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S H O P T A L K

WITH farm hands all over the country deserting the farms for the more remunerative and less arduous work of the WPA and CCC, the farmers have been forced to depend more and more on tractors to get their work done. This will mean more tractor repair work for those rural shops who go after the business. And it will be good business as it will not only keep the shop busy during what is normally a slack period but also the repairs will be of a major character involving cylinder reconditioning for the most part.



KEEPING track of the racing records that are being made at Bonneville Salt Flats is almost as tough a job as finding out who is ahead in the Spanish fracas. Ab Jenkins, England's John Cobb and his compatriot G. E. T. Eyston have each had several turns at establishing new and better world records during the past summer. At the moment Ab Jenkins is

again on top with new records for the 100 mile at 169.57 m.p.h.; 200 mile at 171.30 m.p.h.; 500 mile at 168.44 m.p.h.; 1000 mile at 165.73 m.p.h.; also 171 miles in one hour; 168.46 in three hours and 165.72 miles in six hours. Previous to these records which were terminated because of mechanical trouble, Jenkins had established a series of new records up to and including 48 hours.



BY the time this is read the world series will be a thing of the past. A month later Landon or Roosevelt will have received the decision. Wonder what we'll argue about then.



LIKE some of the old cough syrups, some of the new extreme pressure lubricants required for the hypoid gears should bear the label "shake well before using." The reason is that the EP ingredi-

ent tends to settle to the bottom of the barrel. Of course, that applies only to some of the many makes that are available. But is a thought worth remembering. It won't be so bad as long as the lubricant is dispensed in one gal. containers. But I'd hate to have the job of shaking a barrel of the stuff.



LAST month we carried the descriptions of the 1937 Studebaker and Packard. This month we have the Graham. Next issue we will have the remainder of the 1937 jobs. And what's more there are so many of these new jobs that we had to get a special dispensation from the powers that be to increase the number of editorial pages so that we could take care of them all. It's a big issue, fellows, and one you'll want to keep.

Bill Tobolsky

Getting the jump on



TO get snowed under with winter profits it is first necessary to get the jump on winter business. And to do that it is necessary to start right now to plan how you are going to bring customers into your shop and then what you are going to do after they arrive.

Successful winter sales plans in the past have generally been built around a single service operation which includes all the "winter" jobs a car might need during the cold weather. Naturally such operations are designed to first of all prevent the engine from freezing

and secondly to insure easy starting. The accompanying list includes such jobs and a service station can select those which it feels are best fitted to fill the needs of its particular customers. However, the point to remember is that the customer should be quoted a single

By Bill Toboldt

Winter Business

How To Thaw Out The Frozen Dollars By Selling Complete Winter Service

price to cover all the separate operations.

In other words, first decide all that is to be done to the car to prepare it for winter driving and then place a single price on the entire job and sell it to the customer. For instance, one shop called it their "Winterizing Service," which included Flush cooling system and refill with anti-freeze; clean and adjust breaker points and spark plugs; drain lubricant from engine, transmission and rear axle and refill with winter grade lubricant; check battery and battery terminals; clean and adjust carburetor. Naturally the price quoted for the work did not include parts or lubricants.

Once the car is in the shop, the entire car and engine should be checked in accordance with the accompanying list of operations. In this way, the job which normally would bring in only a few dollars is in the majority of instances increased many times. There is also always an excellent opportunity to sell winter accessories, such as heaters, radiator shutters or shields, skid chains, tires, windshield wipers and defrosters, skid chain adjusters, etc., in addition to those parts which are sold in connection with the "Winterize Service" operations.

When it comes to bringing the customer into the shop, the two most favored methods are direct mail solicitation and the telephone. Direct mail pieces should be mailed at least three times during the early fall and some shops continue them right through the cold weather. The same routine is followed with telephone calls.

The first letter should be mailed approximately two weeks before

Sell These Winter Services

- Check generator armature and brushes. Turn down armature and install new brushes when necessary.
- Check starter armature and brushes. Also starter drive.
- Repair or install new parts as required.
- Check ignition distributor, including cap, breaker points, and distributor shaft bushing. Repair or install new parts as required.
- Adjust breaker points and retime ignition.
- Check ignition condenser. Install new unit when required.
- Check ignition coil. Install new unit when required.
- Check engine ground connection on rubber-mounted engine.
- Clean and adjust spark plugs. For chronic hard starters reduce size of spark-plug gap.
- Check ignition high-tension cable. Replace if necessary.
- Clean all fuel screens.
- Clean and adjust carburetor, including accelerating pump.
- Check adjustment of automatic choke.
- Free and adjust brakes. Reline if necessary. Touch up rust spots and paint top.
- Clean air filter.
- Regroove tires.
- Check muffler and exhaust system for back pressure and leaks.

cold weather normally starts, the second the first day the temperature drops below freezing, so that the car owner will receive it on the same day or next morning.

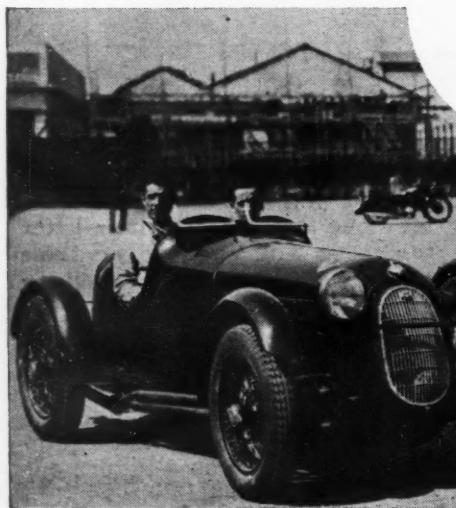
Letters and advertising, in addition to pointing out that the advisability of preparing in advance for cold weather and thus eliminate the possibility of hard starting and the chance of an expensive freeze-up, should list the various parts and units that require inspection and also quote the price of the work. Envelope stuffers, describing

the various accessories you have to sell may also be enclosed with the letter.

If you like a suggested sales letter along these lines, write a letter to MOTOR AGE and two or three tried and proven letters will be mailed immediately.

Automotive jobber salesmen are also prepared to assist in planning winter sales campaigns, in pointing out the advantages of different types of accessories, the equipment that can be used to turn out the jobs more profitably.

Vanderbilt Races Revived



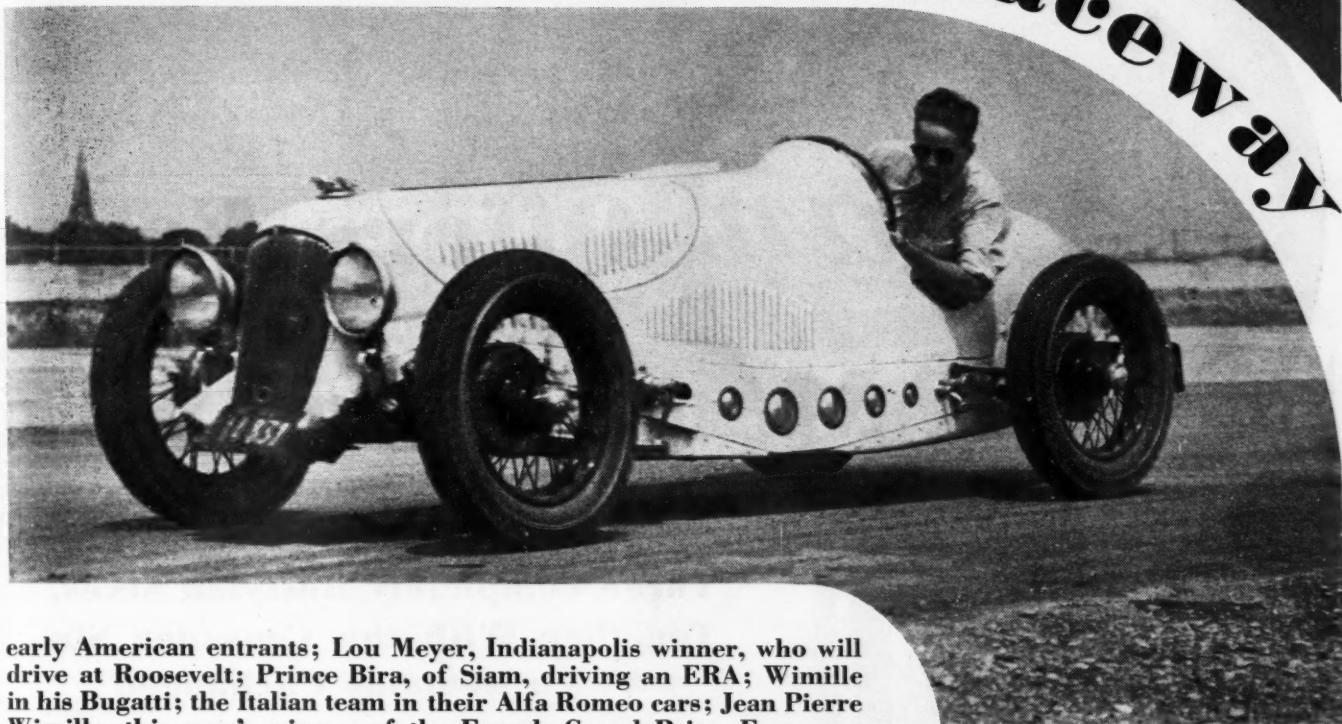
HERE are some highlights of the coming 300-mile race to be held at the new four-mile Roosevelt Raceway at Westbury, L. I., on October 12, which was originally planned for 400 miles. Across the top, beginning on the left, and going clockwise around the pages we have: Tazio Nuvolari, captain of the Italian team; an airplane view of the new Roosevelt Raceway; Babe Stapp, one of the

Roosevelt

Car No.	Make	Entered by	Driver	No. of Cyl.	Bore	Stroke	Displacement	Drive	Weight	Super-charger
Alfa Romeo.	Societa Anonima "Scuderia Ferrari"	Tazio Nuvolari.	12	2.756	3.464	246.4	F	1650	Yes	
Alfa Romeo.	Giuseppe Farina.	12	2.756	3.464	246.4	F	1650	Yes		
Alfa Romeo.	Antonio Brivio.	12	2.756	3.464	246.4	F	1650	Yes		
Alfa Romeo.	Raymond Sommer.	8	2.834	3.937	195.2	R	1608			
Maserati.	Philippe Etancelin.	8	.....	.....	292.8	R	1650	Yes
Maserati.	Freddy McEvoy.	6	.....	.....	91.5	R	1320	Yes
Maserati.	Ralph Bethenod.	8	.....	.....	292.8	R	1650	Yes
Bugatti.	Jean Pierce Wimille.	8	.....	.....	286.7	R	1630	Yes
Bugatti.	Hon. Brian E. Lewis.	8	2.835	3.937	198.7	R	1450	Yes		
ERA.	Earl Howe.	6	2.247	3.750	89.2	R	1350	Yes		
ERA.	P. G. Fairfield.	6	2.247	3.750	89.2	R	1350	Yes		
ERA.	Prince Chula of Siam.	6	2.263	3.744	90.7	R	1400	Yes		
Maserati.	Maj. A. T. G. Gardner.	4	2.716	3.937	91.2	R	1200	Yes		
Du Pont.	Theo. H. Morris, 3rd.	8	3.375	4.500	322.0	R	3000	No		
Bugatti.	Overton A. Phillips.	8	2.375	3.937	143.0	R	1800	Yes		
4 Miller.	James M. Winn.	4	4.250	4.500	255.0	R	1840	No		
5 Miller.	James M. Winn.	4	4.250	4.500	255.0	R	1840	No		
157 Unnamed.	Milt Marion.	4	4.125	4.125	220.0	R	....	No	
6 Gardner Special.	Chester L. Gardner.	4	4.250	4.500	255.0	R	1900	No		
62 Miller Special.	Chester L. Gardner.	4	4.125	4.250	227.0	R	1450	No		
1 Topping Special.	Henry J. Topping, Jr.	Babe Stapp.	.....	.....	.....	R	1800	Yes
2 Boyle Products Spec.	H. C. Hennig.	Bill Cummings.	8	3.375	3.750	268.0	R	2000		
3 Burd Piston Ring Spec.	Lou Moore.	Lou Moore.	4	4.312	4.625	270.0	R	1575	No	
3 Gilmore Special.	W. Wilbur Shaw.	Wilbur Shaw.	4	4.250	4.500	255.0	R	1800	No	
15 Unnamed.	Deacon Litz.	Deacon Litz.	4	4.125	4.250	220.0	R	1830	No	



At the Roosevelt Raceway

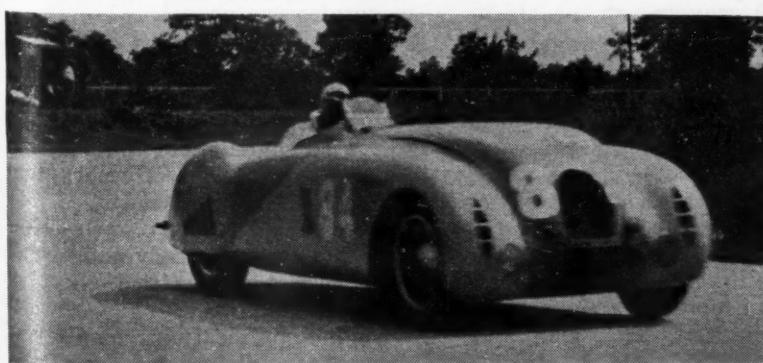
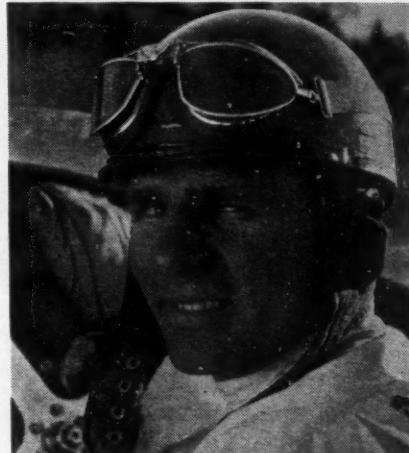


early American entrants; Lou Meyer, Indianapolis winner, who will drive at Roosevelt; Prince Bira, of Siam, driving an ERA; Wimille in his Bugatti; the Italian team in their Alfa Romeo cars; Jean Pierre Wimille, this year's winner of the French Grand Prix. European drivers are accustomed to this type of racing, and may hold a slight edge on the Americans. Below are specifications of the cars.

Raceway Entrants

Car No.	Make	Entered by	Driver	No. of Cyl.	Bore	Stroke	Displace- ment	Drive	Weight	Super- charger
47	Unnamed	Wm. "Shorty" Cantlon	"Shorty" Cantlon	4	4.062	4.750	247.0	R	1800	No
7	Unnamed	Wm. S. White	Geo. Connor	4	4.125	4.625	247.0	R	1800	No
	Unnamed	Dan F. Hogan	Dan Hogan	4	3.062	3.500	104.0	R	1100	No
215	Schallman Special	Virgil Williams	B. Balus	8	2.875	5.000	252.0	R	1950	No
43	Belanger Miller Spec.	Murrell Belanger	Unnamed	8	3.250	3.750	248.5	R	1950	No
38	Marks Miller Special	Joe Marks	Unnamed	4	4.250	4.500	255.0	R	1950	No
	D and N Special	Nickolas Stirone	Don Moore	4	4.250	6.000	340.0	R	1680	No
	Oak Hill Garage Spec.	L. R. Ladd	L. R. Ladd	8	3.062	3.750	221.0	R	1540	...
	Duesenberg	Benny Brandfon	Benny Brandfon	8	2.875	5.000	269.0	R	2250	No
	Halley Bugatti Spec.	McClure Halle	Dave Evans	8	2.362	3.937	142.0	R	1350	Yes
179	Ambler Special	R. B. Lynch	Roy Lake	4	4.724	5.118	359.0	R	1900	No
125	Ambler Special	William Wattis	Chuck Tabor	4	4.724	5.118	359.0	R	1900	No
14	Elgin Piston Pin Spec.	Elgin Piston Pin Co.	Frank Brisko	4	4.250	4.500	255.0	R	...	No
	Unnamed	Rick Decker	Rick Decker	8	2.762	3.500	172.0	R	1450	...
	Jr. Offenhauser Spec.	Ruth Rastelli	Bob Swanson	4	3.062	3.500	105.0	R	1150	No
	Miller Special	John L. Buckley	John Cabulas	4	4.250	4.125	235.0	R	1900	Yes
	Debaet Special	Michel Debaet	Unamed	6	...	...	245.0	R	1500	...
	Burd Piston Ring Spec.	Joe Lencki	Unamed	4	4.250	4.500	255.0	R	2000	No
	Mercedes	Michael Caruso	Bob Sall	4	2.750	5.125	122.0	R	1750	Yes
	Carew Special	John Campbell	Unamed	4	4.000	4.250	212.0	R	2011	...
	Amer. Twist Drill Spec.	C. Wagner-T. Nowiak	Unamed	8	3.062	4.250	250.0	R	1900	No

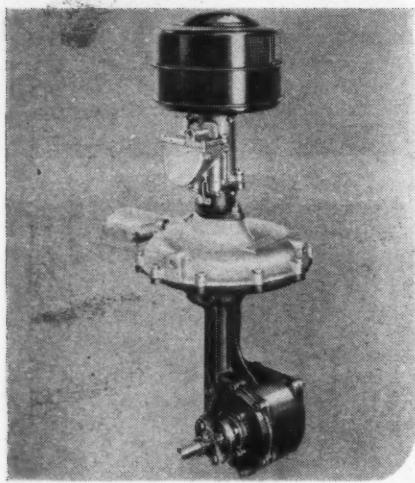
At the time MOTOR AGE went to press, the above table represented last-minute information covering the entrants and drivers, with their car specifications. In addition to those listed, Joel Thorne has seven entries, Leon Duray two, and one each for Lou Meyer, Harry Hartz, Ab. Jenkins, Dave Evans, Louis Kimmel, Phil. Shafer, John Fell and Emil Andres.





Three Completely Restyled Sixes, Together With the Crusader Six Which Remains Unchanged

By Joseph Geschelin



Top: method of lubricating pistons and cylinder walls

Above: the Supercharger, used on two 1937 Models

THREE completely restyled six-cylinder lines, all in the low-priced class, are offered by Graham-Paige Motors Corp. for 1937; these are in addition to the Crusader Six, Series 85, which will be carried into the 1937 market unchanged. The complete line now comprises the Crusader Six, Series 85, on 111-in. wheelbase; the Cavalier, Series 95, on a 116-in. wheelbase—up 1 in. over last year; the Graham Supercharger, Series 116, mounted on 116-in. chassis; and the Graham Custom Supercharger, Series 120, mounted on the 116-in. chassis for coupe bodies and on a new supercharged 120-in. chassis for sedan models.

Cavalier and Supercharger bodies are new, with a sharper angle V-type windshield having a wider opening for better visibility. New body types for Series 95 and 116 comprise two-door and four-door models with and without trunks, a business coupe and a sport coupe with rumble seat. The same body styles except the two-door are of-

fered on the Series 120. The front end appearance has been changed considerably by increasing the spacing of horizontal bars in the radiator grille, the introduction of a new medallion and radiator ornament, and by sweeping the center section of the radiator grille back along the top of the hood in a corrugated panel. This produces a wide fixed center panel at the top of the hood, resulting in two hinged hood sides. Louver treatment is new on all models. Deep front fenders are new, and body styling has undergone some changes to modernize eye appeal.

The instrument panel employs a center "tower" section of Tenite, with King-Seeley electrically controlled instruments set in a vertical row with edge-lighted illumination for the dials. The former steel roof construction is continued. It features a steel insert top section insulated from the body and serves as a very sensitive and effective radio antenna.

Engine specifications remain unchanged, except in detail. The Cru-



sader Six is a 6-cylinder, 3-in. bore x 4-in. stroke, 169.6 cu. in. displacement, compression ratio 6.8 to 1 with aluminum head, and rated 70 h.p. at 3500 r.p.m. The Cavalier Six is a 6-cylinder, L-head, 3 1/4-in. bore x 4-in. stroke, with displacement of 199 cu. in., and rated 85 h.p. at 3300 r.p.m. with aluminum head giving a compression ratio of 6.7 to 1. The same engine is used on the Supercharger Series 116, but with the supercharger the engine is rated 106 h.p. at 4000 r.p.m. with the same compression ratio. The Custom Supercharger Series 120 is a 6-cylinder, L-head, 3 1/4-in. bore x 4 3/8-in. stroke, 217.8 cu. in. displacement, compression ratio 6.7 to 1 with aluminum head, and rated 116 h.p. at 4000 r.p.m. with supercharger.

Supercharging has been so well received that the time-tried Graham supercharger is now designed into two models instead of only the highest priced job, as in 1936. It is driven, for increased quietness, by an exposed double-belt drive using Manhattan-Raybestos belts.

Extensive changes have been made in the engine lubrication system on the two supercharged cars and the Series 95. One element is improved breathing in which the crank rotation serves as a positive pump.

(Continued on page 64)

Upper: the new Series 120 Standard Sedan. Center: Series 116 Sedan, with trunk. Lower: The Cavalier, Series 95, with trunk. Bottom: (left) Transmission, with new compact overdrive unit. (right) Showing new style instrument panel and location of defroster.



"Gloria, will you please pull down that shade!"

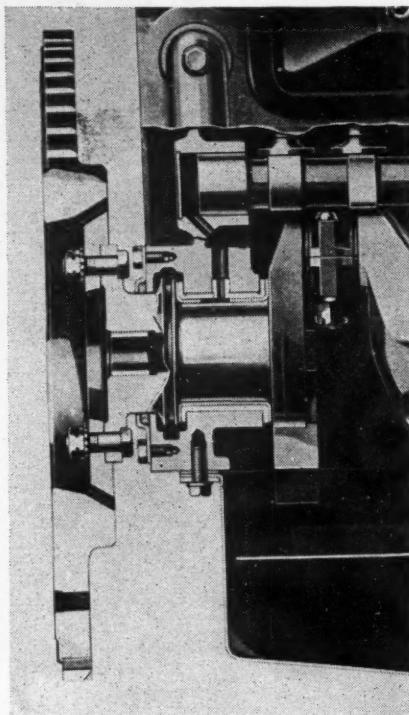
THIS department is written by the readers of Motor Age themselves! It presents their questions, their problems together with the practical analysis of the difficulties and replies from Bill Toboldt (left), editor of Motor Age and "Hank" Hankinson (right), technical editor. Read the Clearing House—then write us!

Rear Main Bearing Oil Seal Leaks

We have a customer who has a 1932 DeSoto leaking oil at the rear main bearing and as we have never had any experience with this car would like to know whether the oil seal gasket can be put in without removing the crankshaft.

He had the lower half put in and wants us to put in the upper half. Tracy P. Loy, Loy's Garage & Machine Shop, Hitchcock, Okla.

IT is not necessary to remove the crankshaft to install the rear main bearing oil seal, but it is necessary to remove the transmission, clutch and flywheel in order to make this part accessible. The lower half of the oil seal can be put in from the underside simply by dropping the clutch housing pan, but the upper half is held in place by cap screws which cannot be turned out because of interference with the flywheel. Therefore, it is necessary to remove the flywheel in order to provide room for removing these cap screws. The DeSoto factory flat rate time on this job is six and one-half hours.



ECONOMY TROUBLE WITH CARBURETOR ADJUSTMENT

We have had considerable trouble adjusting the Stromberg carburetor URO-2 on the model 1933-8-100-A Auburn which is in our garage at present.

We can't get even 10 miles to a gallon of gas. Will you kindly send us, as early as possible, any information you possibly can and also kindly send us a chart on this carburetor (URO-2) showing in detail all the passages of gas and air and showing plainly all the adjustments to be made or altered?—Mike Lewrock, 1938 3rd Ave., Pottsville, Pa.

IT MIGHT suggest that you look for trouble with the economizer pistons designated by No. 33 in the illustration and in the economizer by-pass

jet No. 20. I understand that some difficulty has been experienced due to the economizer piston sticking in the carburetor passage so that the economizer shaft is inoperative. I would also suggest that you check the float level carefully and that you replace the idle adjusting screw as it is a pretty safe bet that the screw has been damaged by having been turned too far into its seat.

I notice from your letter that the reason you feel that the carburetor is at fault is because of the fact that the car delivers poor gasoline mileage. As you no doubt know, gasoline economy is dependent upon so many other conditions aside from the condition of the carburetor that it is vitally important that these other conditions be properly checked before the blame is placed on the carburetor.

TOP SPEED IS LOW AND JOB OVERHEATS

I am having trouble with a 1933 Graham Six sedan. It lacks speed and continually overheats. Its top speed is 57 M.P.H., but oddly it will go up a steep hill at 45 M.P.H. and has lots of power.

It has a new set of champion C-4 spark plugs. The radiator has been cleaned and the water pump disassembled and found O. K. A new coil and condenser have been tried with different ignition settings. The tappet clearance is .010 in. and the intake valve opens at T.D.C. The camshaft was set ahead one tooth with no improvement. The valves

have been reconditioned by the vibrocentric method. The thermostat has also been removed. The motor is in good mechanical shape and the rings were inspected and found O. K. They have run 5,000 miles. The compression is uniformly 100 lbs. The brakes do not drag, and the car is easily rolled. Any help you may be able to offer will be greatly appreciated.—Tom Kreuder, Portland, Oregon.

THE first point I would check on this job is the ignition timing to be sure that it is set exactly three degrees or one flywheel tooth before top dead center. Late timing will bring about all of the characteristics you mention. Then I would suggest that you check the governor weight advance and check the points and plugs for proper gap.

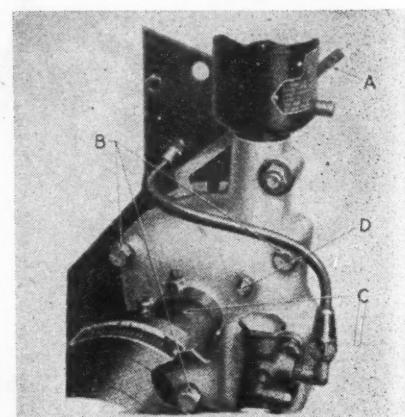
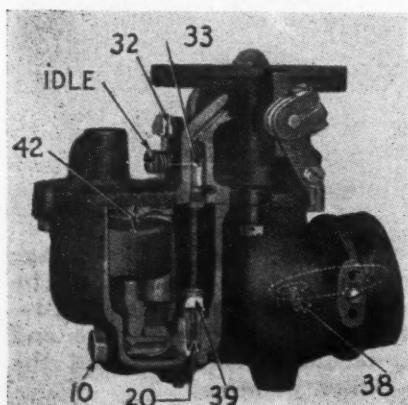
Another point that is often overlooked when checking for the cause of low top speed or overheating, or both, is the condition of the exhaust line. By that I mean the heat control valve in the exhaust manifold may be stuck causing all of the exhaust gas to pass around the heat chamber of the intake manifold before it passes out through the muffler. If this condition exists, the engine will overheat and the restricted passage of the exhaust gas will set up a back pressure which will materially reduce top speed. If these points check satisfactorily, then I would remove the muffler and run the job to see if the difficulty is caused by a clogged muffler. This might well account for the trouble you are having.

STOP OIL LEAK AT FRONT OF ENGINE

We have been attempting to stop an oil leak in a 1928 Essex, with very little success. It leaks past the crankshaft and the felt packing on the front timing plate.

We have replaced the packing and gaskets several times with no results. We have also enlarged the drain-back hole in the front main bearing.

We have installed new piston rings and reconditioned the valves in this motor recently and it uses a quart of oil to every twenty-five miles.



We adjusted the main bearing, and the motor has very little blow-by. Meadow Glade Garage, P. O. Battle Ground, Wash.

I AM inclined to believe that this oil leak is not coming from the front main bearing but rather is caused by the timing chain adjusting plate being broken at the bottom and that the oil is leaking out of the distributor gear housing and is running down the engine front support plate which would give the appearance of a leak at the crankshaft. As you perhaps know, if someone attempts to adjust the timing chain by the use of this adjusting plate located between the distributor gear housing and the engine front support plate without first removing the three bolts marked "B" in the accompanying illustration, the adjusting plate will tear at the bottom and while it is possible to get the proper adjustment of the timing chain without removing these bolts, it invariably results in an oil leak owing to the damage caused to the adjusting plate.

It may be that the gasket between the engine front support plate and the block was damaged when the front main bearing cap was reinstalled. This gasket comes down in front of the main bearing cap and would easily be torn if the cap was not carefully removed and installed. This, of course, would cause a bad oil leak at the front main bearing.

I believe it will be necessary for you to remove the generator and the distributor housing and replace this adjusting plate if you are satisfied that the leak is not at the front main bearing. By removing the engine side pan and lying under the car with the engine running, I believe you will be able to see that the oil is coming down the back of the engine front support plate.



"I didn't say O.N.T. thread—I said S.A.E. thread!"

A Word About The Readers' Clearing House

THE Editors of MOTOR AGE want to help you. That's how the Readers' Clearing House began many years ago—and that's why it continues to grow more popular every day.

It makes available to you—at no extra cost—the years of actual shop experience of trouble-shooters like Bill Toboldt and "Hank" Hankinson . . . and in addition to that, there are files of vital information dating back to the very beginning of the industry, preserved for our readers and made available through correspondence with the Readers' Clearing House.

We cordially invite you to submit any of your business problems, whether they be mechanical, technical or legal . . . whether they be questions on buying, selling or merchandising . . . or problems of shop layout and construction. . . . All of these problems have their solutions and the men of MOTOR AGE want to help you find them.

Every year thousands of repairmen write the Clearing House—but the important point is that you take advantage of this reservoir of facts yourself. Write the Readers' Clearing House today!

When writing, please use your business letterhead or attach a business card to indicate your connection with the automotive trade. Name and address will be withheld from publication on request.

The Editors.

SERVICE HINT

A COMBINATION intake muffler and wet type air cleaner is now being used on the 1936 Studebaker cars, to reduce intake noise. When installed on the Dictator series in field service, it is necessary to change the carburetor main metering jet from .058 in., which is the standard jet, to one .002 in. smaller, or to a jet size .056 in.

ASK US ANOTHER!

Here is a picture of a light delivery truck. Will you kindly send us tune-up data for same?



This truck is as follows: Three cylinder, air cooled, two cycle, friction chain drive, name on rear hub, Hatfield.

The information which I really want is who manufactured this car and in what year. Do not spend too much time but thought your company might have some information along this line. O. L. Stearns, Stewart's Service, 301 Duff St., Clarksburg, W. Va.

I SUPPOSE you have been laughing up your sleeve thinking that you had us licked with this one. But, I am pleased to be able to tell you that the laugh is on you.

The light delivery truck of which you sent me a picture was known as a Hatfield Light Express and was made by the Cortland Cart & Carriage Company of Sydney, N. Y., during the years 1912 and 1913. During 1912 it was known as Model G and in 1913 it was known as Model J. The original price was \$850 at the factory and the weight of the Model G is given as 1000 lb. with 1700 lb. given as the weight of the Model J. Both trucks were 88-inch wheelbase jobs and used 34 x 2 solid tires. Both used a friction type transmission with chain drive to the dead rear axle, the drive reaction being taken through the radius rods. The engine was a three cylinder, two cycle, air cooled job, with a bore of 4.13 inches and a stroke of 4.00 inches. Piston displacement was 160.5 cu. inches. The engine was a single ignition job with a Bosch Magneto and used a Holley carburetor.

So there you are, Mr. Stearns. If you have any more tough ones like this one—send them along and I'll take a little side bet that we make a hit every time we come to bat.

WHY IS MUFFLER NOISY GOING DOWN HILL?

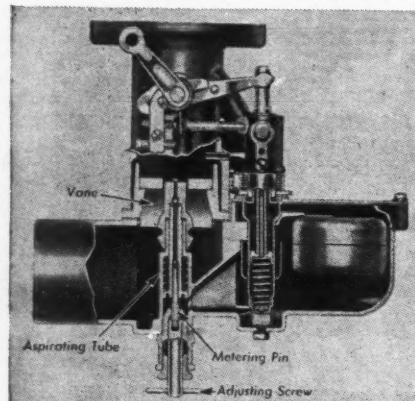
I have a 1932 Cadillac 12 that has around 60,000 miles and is in the best of condition. Has had a set of rings and the valves were ground 2000 miles back. Points have just been synchronized, plugs test O. K., motor has very

good power but it does not idle as good as it should.

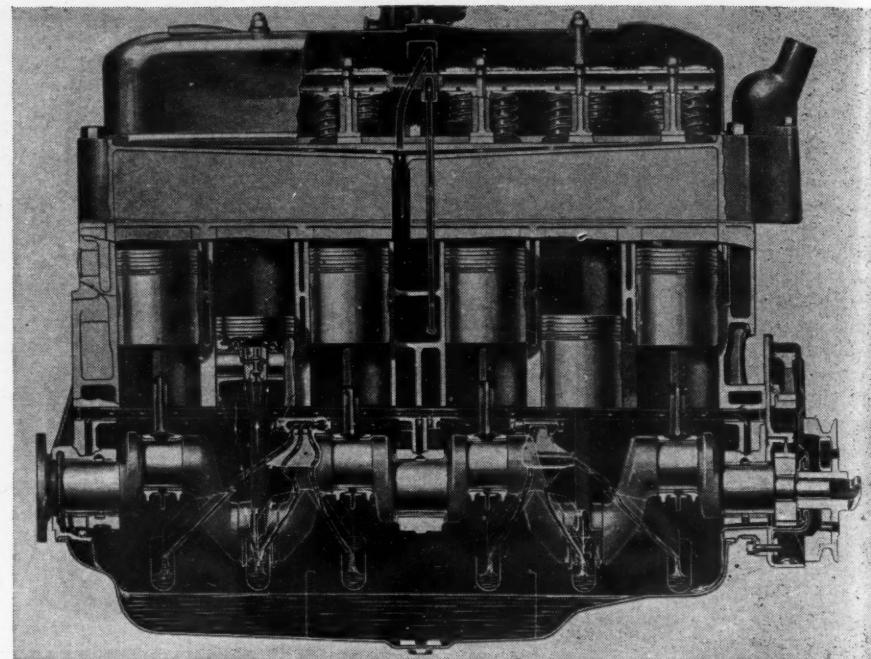
What I want to know is why it spits back in the mufflers going down hill? When driven at about 25 to 30 miles per hour and as soon as you take your foot off the accelerator it starts spitting back. It seems to get gas in the mufflers and then fires it. The noise is not loud like a back-fire. Parker J. Conner, Conner's Garage, Bethel, Maine.

THE poor engine idling and the sputtering in the muffler of the Cadillac would seem to indicate either a too lean adjustment of the carburetor or the presence of air leaks at the carburetor to intake manifold flanges or at the intake manifold flanges where they are connected to the cylinder block. A little gasoline squirted on these connections should readily indicate the presence of leaks.

I am wondering if both carburetors on this car have been adjusted exactly alike. In other words, one carburetor may be adjusted leaner than the other which would have a tendency to give you the condition you describe. The



procedure for adjusting these carburetors is to disconnect the throttle rods from the right hand carburetor and adjust the left hand carburetor first. The idle adjustment screw is located in the bottom of the carburetor and controls the gasoline. Turning the screw in produces a lean mixture and turning it out produces a rich mixture. After a satisfactory adjustment of the left hand carburetor has been secured, the right hand carburetor should be adjusted in the same manner. This engine should idle at 320 revolutions per minute, and this can be checked by removing the oil filler cap from one of the valve covers and holding a finger on one of the valve rocker arms so that the movement of the rocker arm may be counted. At 320 r.p.m. the valve will open 40 times in 15 seconds. When both carburetors have been properly adjusted, the throttle control rod should be reconnected to the right hand carburetor after the length of the rod has been adjusted so that connecting it to the throttle lever does not change the idling speed of the engine.



Oil Leak At Front End Of Crankshaft

We would like a little information on how to stop a 1934 Master Chevrolet from leaking oil out around the crankshaft, at the front end; the oil comes out around the fan drive pulley. It continues to leak slightly while driving and when the motor is first shut off it will leak very bad for a minute or two.

Perhaps you can tell us the necessary steps that must be taken to remedy this trouble. W. A. Kastner, Kastner Bros., Mauston, Wis.

IN the first place, I would check the oil slinger that is on the front end of the crankshaft between the crankshaft timing gear and the timing gear case cover. In other words, you will have to pull off the fan drive pulley and the timing gear case cover to reach this oil slinger. It is possible that this oil slinger has been removed at some time and has been reinstalled improperly. The shoulder of the oil slinger should be toward the crankshaft timing gear.

There is another point that should be checked and that is the timing gear oil nozzle which supplies oil to the timing gear. This nozzle is screwed into the crankcase front end plate. While you have the timing gear case cover off, I would check the position of this nozzle. It must point straight down so that it will deliver oil directly on the crankshaft gear and should not vary from this position more than a position that will direct a stream of oil at the point where the crankshaft and camshaft gears mesh. Cases have been known in which this oil nozzle became loose in the end plate and worked itself out so that oil was delivered directly through the hole in the end plate rather than through the nozzle. This,

of course, allowed an excessive amount of oil to be supplied to the timing gear compartment and caused a leak at the front end of the crankshaft. The position of the nozzle is very important and should be checked carefully.

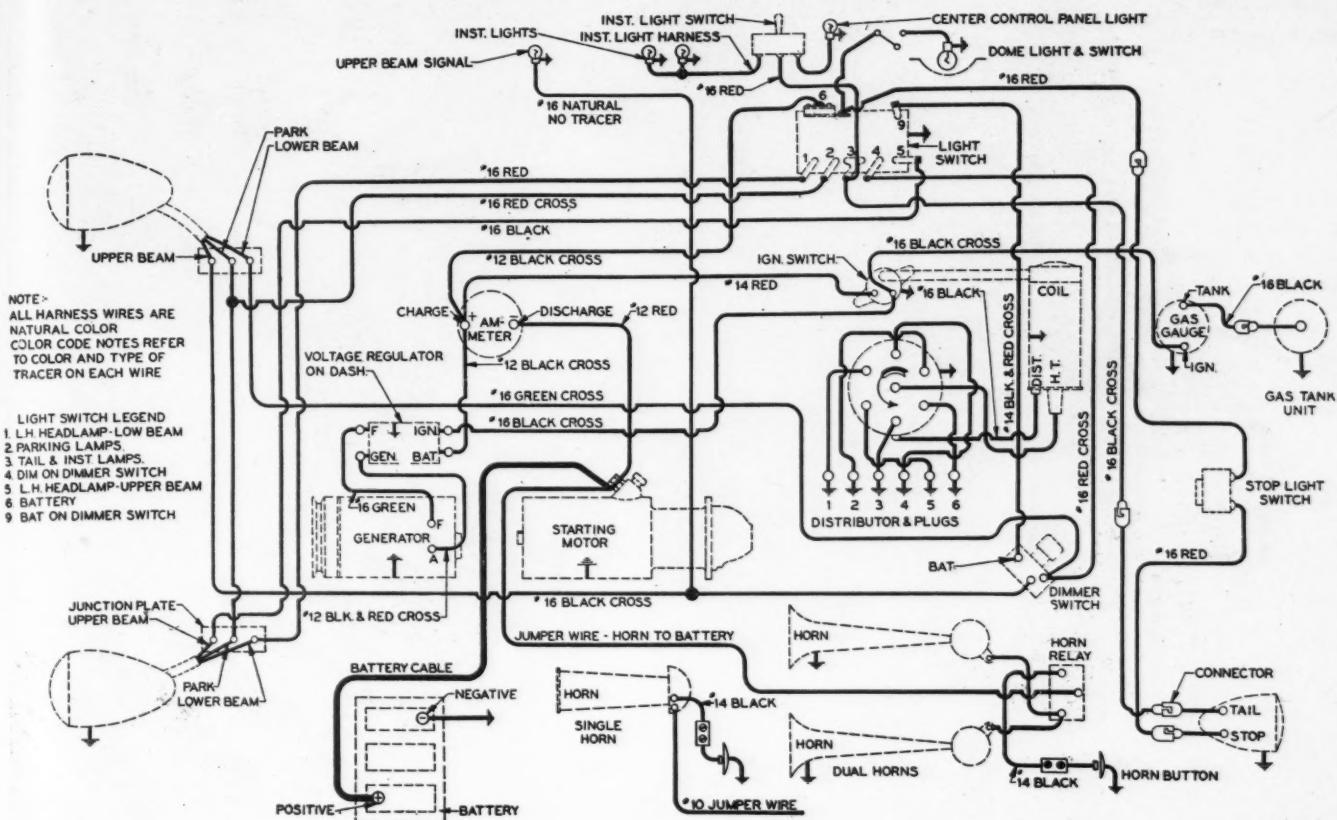
If the oil nozzle is in the proper position and the oil slinger is new and installed properly, I believe you will eliminate your trouble.

WANTS WIRING DIAGRAM

Please give me a wiring diagram on a 1936 Oldsmobile 6. Also on a voltage regulator and cutout control and how to adjust same. Also, give me a diagram on generator on this car and state why two wires run to same.

Could you give me wiring diagram and equipment to use for making outfit to test generator and starter? C. B. Norris, Marrowbone Garage, Marrowbone, Ky.

HERE is a wiring diagram of the F-36 Oldsmobile and from it you will note that one of the wires leading from the generator is the regular ammeter wire and the other one is a lead from the generator field terminal. The principal of operation is that the output of the generator is proportional to its field current. The regulator varies this current by intermittently introducing a resistance in the field circuit. This is accomplished by using two electro-magnetic coils to attract an armature against an armature spring. The movement of the armature closes or opens a set of contacts which short circuits the resistance or places it in series respectively with the generator field. The voltage regulator is known as



the vibrating type to distinguish it from the step type. The vibrating type differs from the step type in that it vibrates continually to hold the voltage to a pre-determined value.

Procedure for checking the generator output and adjusting the voltage regulator is contained in an article which appeared in the September issue of *MOTOR AGE*. I am attaching a copy of this article to this letter as I believe it goes into the matter more thoroughly than would be possible in a letter.

As far as making a test bench is concerned, I believe it would be much better for you to purchase any one of the various pieces of testing equipment that are on the market. These various instruments can be purchased in price ranges from approximately thirty dollars (\$30) up, depending upon the completeness of the instrument for testing other units besides generators and starters. Considerable time and expense would be involved in making up such an outfit and I believe this money would be more wisely spent in purchasing one of the new motor analyzers.

Don't Cuss Write Us!

CASTER ADJUSTMENT FOR STEERING TROUBLES

Our firm has been in the wheel aligning business since 1926 and have encountered a number of difficult jobs during that time, but have always managed to solve all problems that confronted us up to 1935 and 1936 Terraplane automobiles.

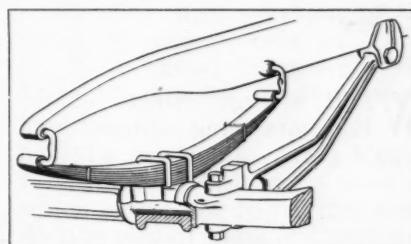
The difficulty we encountered there is a weaving condition. In fighting this condition we have resorted to every trick of the trade—caster, camber, toe-in, tram, correct relation of worm sector with straight ahead position of front wheels, raising caster beyond tolerance limit.

Although we have improved most of these cars we have not entirely eliminated the trouble. Most of these jobs have cost us money because we are willing to pay for our own education, but there is also a limit to that, to how much we may do and still remain in business. Wm. Pecot, The Brake Shop, 728 Fourth St., Santa Rosa, Calif.

I HAVE heard very little of this type of complaint with the 1935 models and it would seem that the normal procedure for correcting a condition of this kind should be effective in eliminating this trouble.

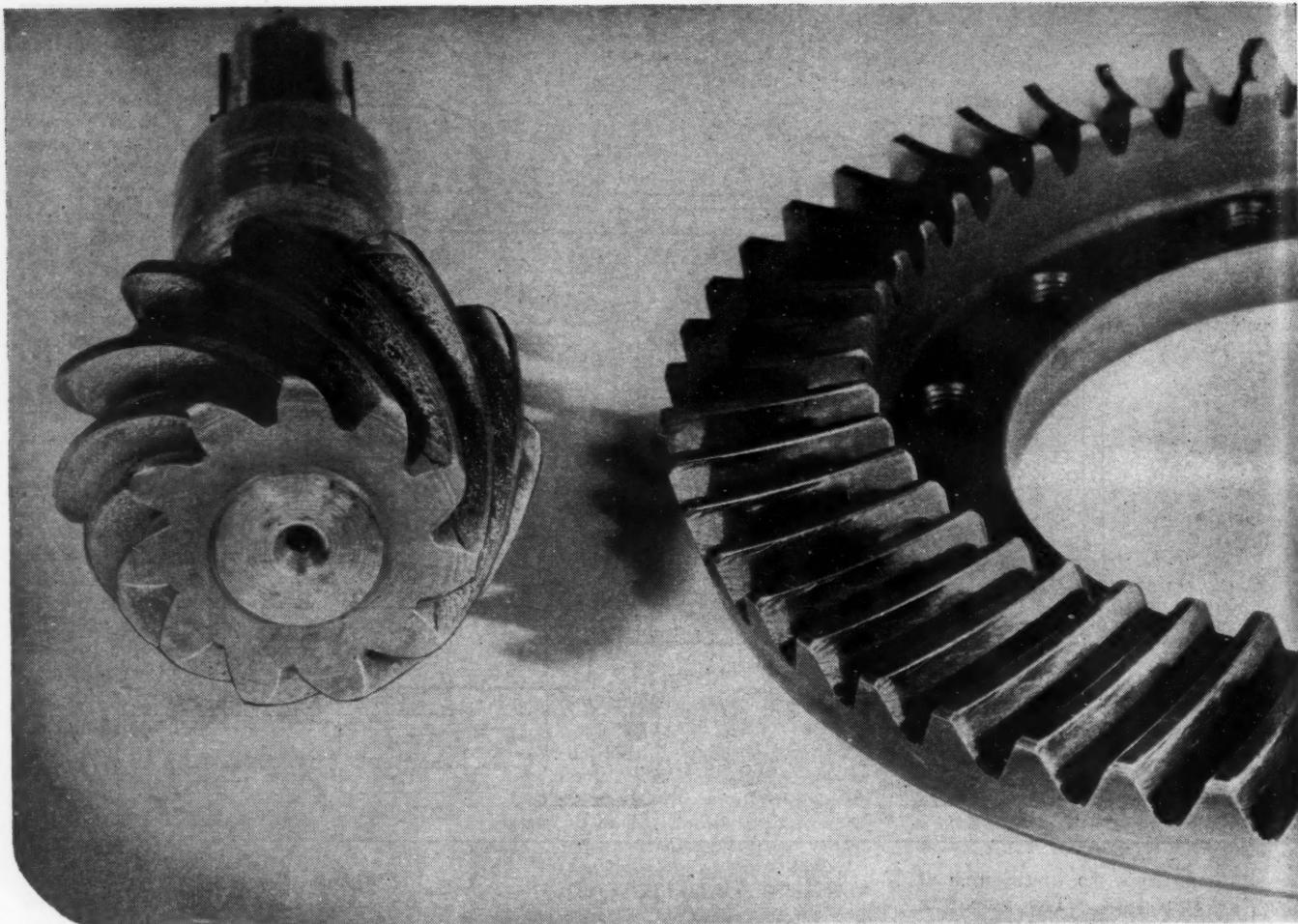
Caster specifications for the 1936 models have been changed and are now two degrees minimum and three degrees maximum. This change was made possible through the adoption of a new type of king bolt lubricat-

ing fitting which provides additional lubrication for the king bolt. I would suggest that you secure these new



lubricating fittings from your nearest dealer as they will assist materially in lubricating this point, and will make it possible to reduce caster to the new limits, to further improve handling.

Cases have been called to my attention in which caster of these 1936 models has been changed by bending the torque arms rather than by installing shims at the front end of the torque arm where it attaches to the axle I-beam. If these torque arms are bent, you will experience considerable difficulty in handling the car and I would suggest that you first check to be sure that these arms have not been bent. Go over the steering gear adjustment again and be sure that the front wheels are in a straight-ahead position when the steering gear is in its center position. This is very important, as you know, and must be right. Tire pressures should also be checked to be sure that the front carries 24 lb. and the rear 30 lb.



WITH a large number of the 1937 cars being equipped with hypoid gears, car owners will find it more economical to have all of their lubrication work done at the same station, since trouble will result if different brands of the special lubricant that is required are mixed. Service stations, therefore, have a wonderful opportunity to retain such customers provided they do a good job selling the customer on the lubrication requirements of their cars and the ability of the station to take care of them.

The hypoid gear drive was developed to make it possible to place the propeller shaft lower in the axle center, which permits lowering the floor of the car without having to use a tunnel for the shaft. Then too, hypoid gears are quieter in operation.

Insofar as the mechanical set-up of the ring and pinion is concerned there is practically no difference between the hypoid and the spiral bevel types. The pinion is located with relation to its depth in the ring gear by marks placed on the face of the pinion by the manufac-

Hypoid Gears Are Here

**Are You Geared To Take Care
of Them With E. P. Lubricants?**

turer, and is placed in the proper position in the housing by means of shims or the screw-type adjusting sleeve. A micrometer depth gage is used to locate the pinion, which follows the practice that has been in effect with several car manufacturers during the past few years. Adjustment for lash is obtained by moving the ring gear

closer to or farther away from the pinion, just the same as in the case of the spiral bevel type.

It has been stated above that the pinion is located below the center line of the axle shaft in the case of a hypoid gear, and therein lies the cause of the difference in operating characteristics between the hypoid and the spiral bevel gear. It will

By Robert Hankinson

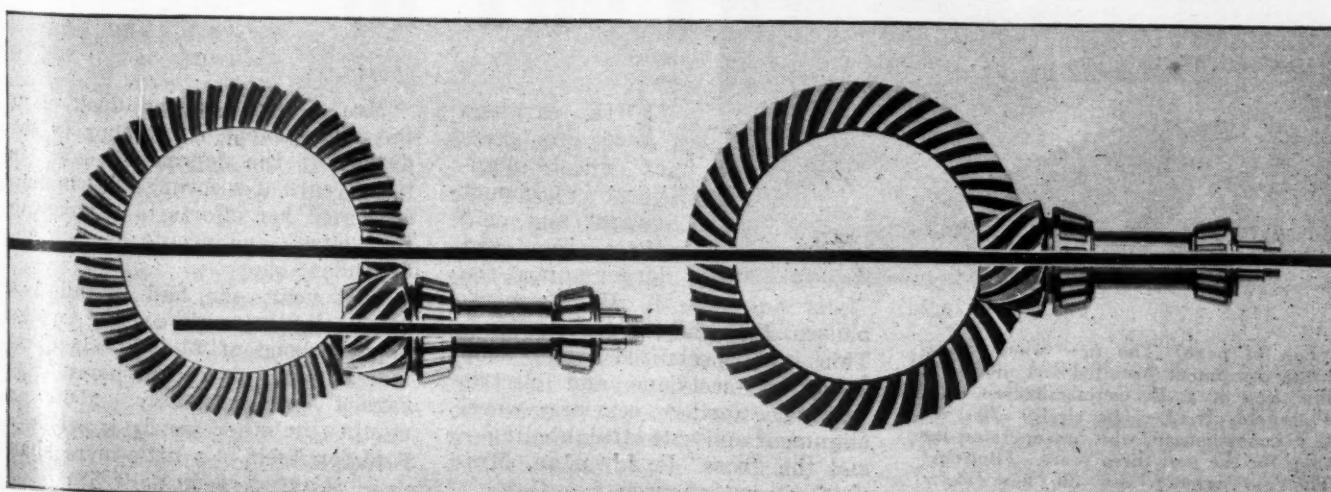


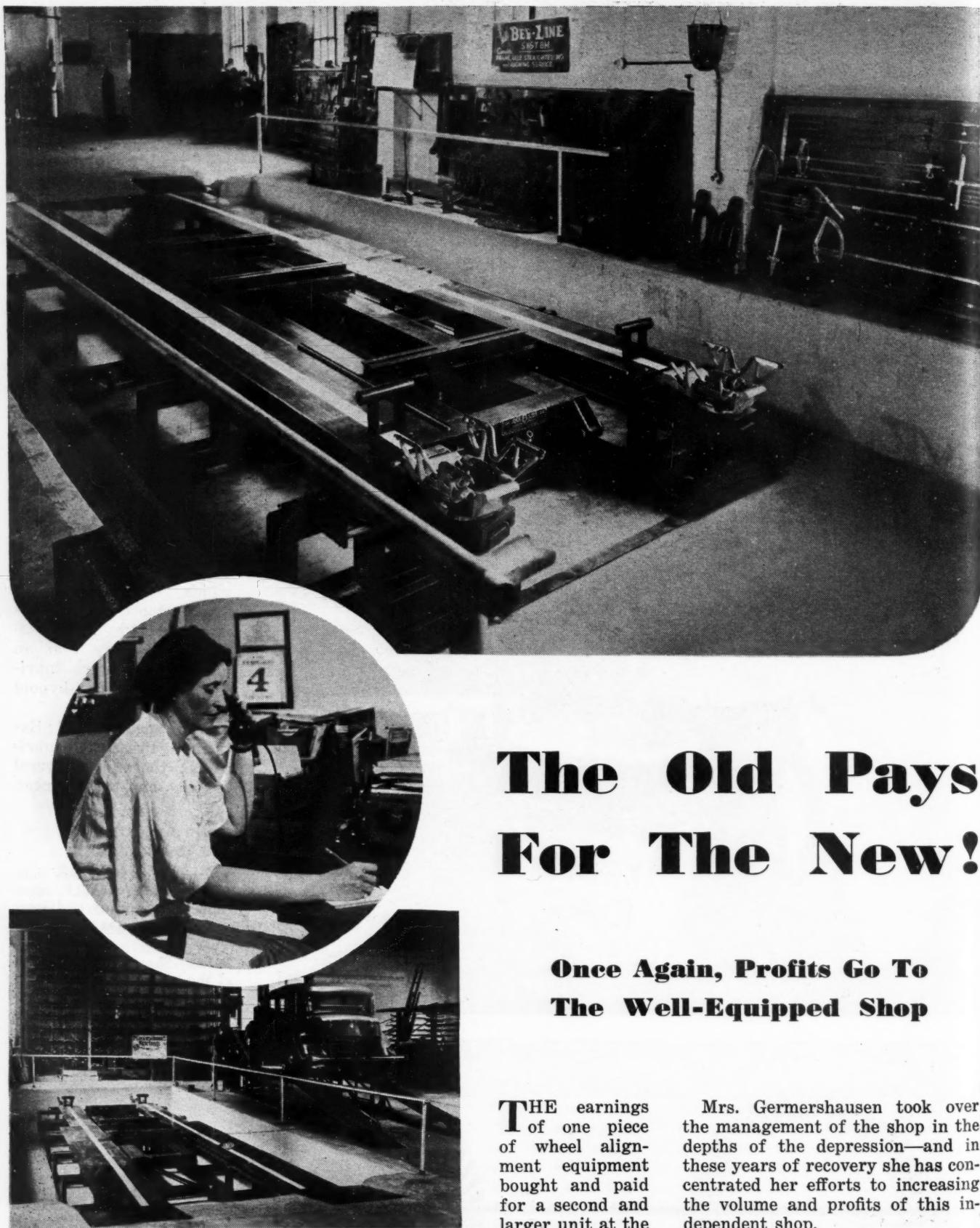
be readily understood that with the pinion located "off center" so to speak, the gear is combining some of the characteristics of the worm drive with the spiral bevel drive. In other words, in addition to the tooth contact which furnishes the power to drive the ring gear, there is a sliding motion on the tooth surface similar to the worm gear action, when the teeth of the pinion gear mesh with and disengage from the teeth of the ring gear. This sliding contact between the teeth naturally creates considerable heat, which, combined with greater tooth pressure, is the reason why it is absolutely necessary that an Extreme Pressure lubricant be used for hypoid gear lubrication.

And speaking of Extreme Pressure lubricants; there are several brands on the market,

Top of Page 30—Gears damaged by use of non-E.P. lubricant. Note pitting and score marks

Below—Showing the location of the pinion of hypoid gears (left) and spiral bevel gears (right).





(Top of page) The new wheel alignment equipment installed last month in the shop of J. H. Germershausen, Inc., Plainfield, N. J. (In circle) Mrs. H. C. Germershausen, who has operated the shop for the past three years. (Bottom) The old (right) and the new (left) wheel alignment equipment.

The Old Pays For The New!

Once Again, Profits Go To The Well-Equipped Shop

THE earnings of one piece of wheel alignment equipment bought and paid for a second and larger unit at the J. H. Germershausen, Inc., shop, Plainfield, N. J. This is a specialized repair shop doing oxy-acetylene and electric welding, spring service, wheel alignment and axle straightening—and the "boss" is a woman, Mrs. H. C. Germershausen.

Mrs. Germershausen took over the management of the shop in the depths of the depression—and in these years of recovery she has concentrated her efforts to increasing the volume and profits of this independent shop.

Last year, she had installed a wheel aligning unit costing in the neighborhood of \$1,600. Since its installation, the equipment has earned approximately \$500 a month. In other words it actually paid for itself in a little more than

(Continued on page 58)

By Julian Chase

FROM the point of view of the common man, the most tragic part of the conflict in Spain is its absolute futility. Not one of those who make up the mass of the population will in any way be better off for all the horror and bloodshed regardless of the outcome. Spaniard kills Spaniard. All Spain suffers the agonies of brutal warfare. No one gains. It is an atrocious example of the stupidity, the assinity which an unfortunately large part of mankind displays in its attempts to settle differences of political opinion.

This view of the hellish mess assumes that the so-called civil war grew out of a political contest between those, on the one hand, who would have Spain adopt a Communistic form of government and those, on the other hand, who would have their country turn to Fascism. In statements that have been given out, the leaders of the rebels have offered a liberal program which sounds well enough but the interest of Italy and Germany, on one side, and of Russia and France, on the other, has been shown to be so keen as to cast suspicion on the democratic protestations of the rebel leaders. There can be little doubt of the Communism of the loyalists. There is, therefore, good reason to suppose that the assumption made in our



America—The Land of The Common Man

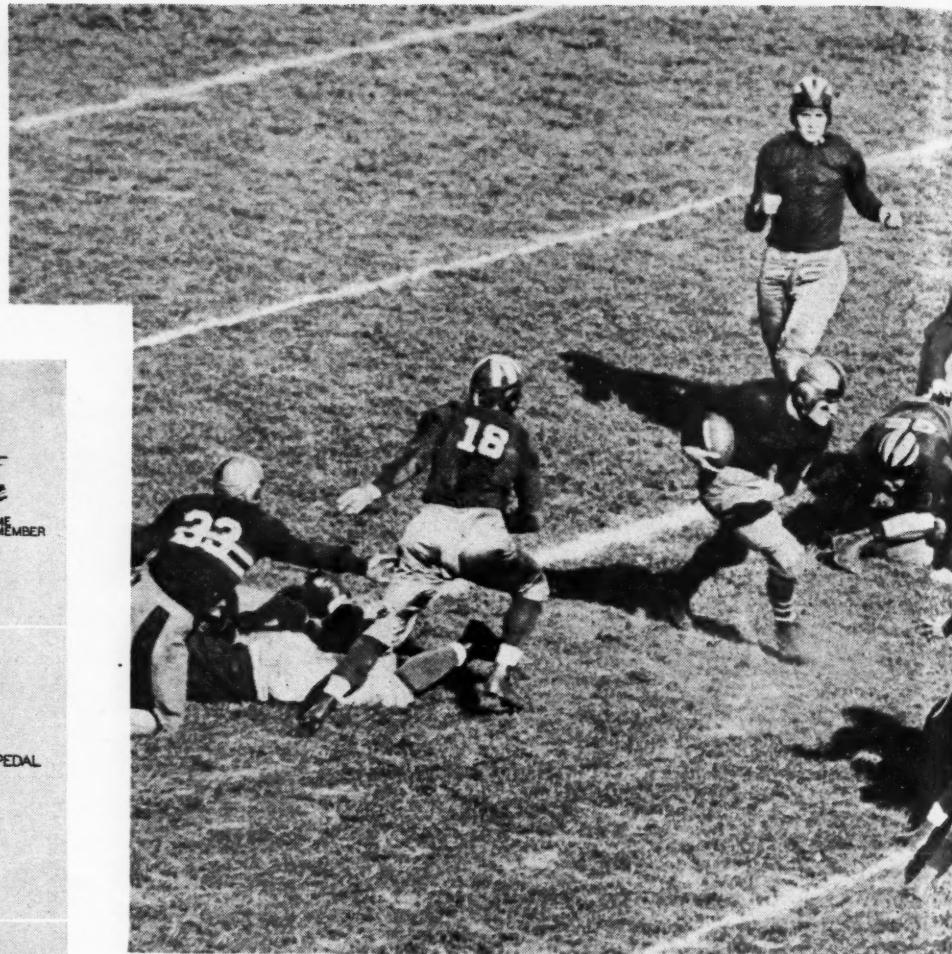
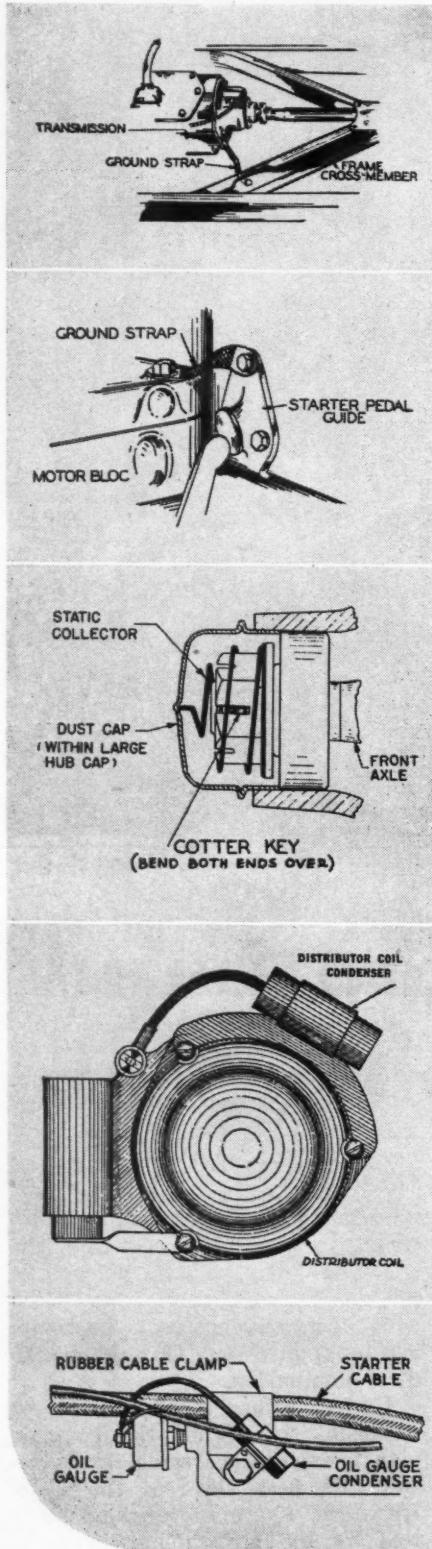
first paragraph is broadly correct.

Essential to both Communism and Fascism is a planned economy. A planned economy, which necessarily means a drastic governmental regulation of at least all of the major elements of life and most certainly of all business whether it be manufacturing, agriculture, distribution, communication, transportation or any of the other thousand and one services which one man renders for another or for all, is pointless and useless unless the

plan as a whole is carried out. With human beings what they are, the carrying-out can not be accomplished without unyielding pressure. And the necessary pressure can be applied only through tyrannical domination.

Under either Communism or Fascism, the lot of the common man is exactly the same in net result. He is a slave of the state. He works where and at what he is told by the government to work, (Continued on page 83)

Down the column: Ground strap from transmission to frame cross-member. Ground from engine to starter pedal bracket on 1936 Oldsmobile. One type of front wheel static collector. Condenser installed on Ford coil. Condenser installed on electric oil pressure gage—1936 Ford. Ground strap from torque tube to frame cross-member.

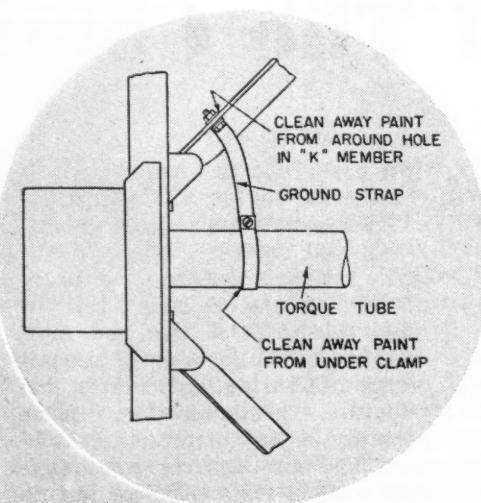


Break Up That

THE installation of an automobile radio set involves electrical and mechanical considerations not encountered in the everyday household receiver. The performance of

the radio, as well as the performance of the car itself, can be seriously affected by the manner in which the installation work is done. The ignition system of an automobile is similar to a radio spark transmitter; sparks at the distributor and spark plugs set up a wide band of radio frequency waves throughout the entire electrical system. The generator, likewise, because of small arcs that occur between the brushes and the commutator, is another source of radio interference. The problem of eliminating these disturbances is the most important as well as the most difficult job the radio man has to solve; and he is faced with the fact that the same make and model of car and radio will respond differently to the methods used.

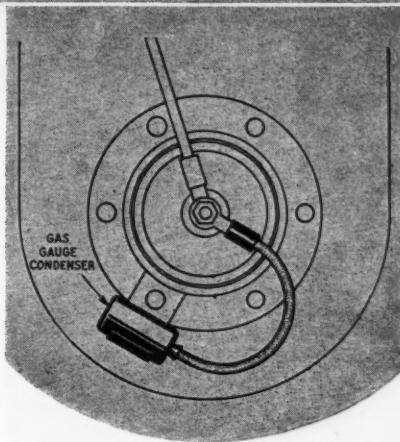
There are three general





By Robert Hankinson

Condenser installed on electric gas gage tank unit.



and bonding at all points likely to transmit ignition interference to the loud speaker will usually take care of this class of disturbance.

The third group is classed as the static discharge group, and consists of static given off by wheels and tires, and by the road surface. It is easy to pick out this class of interference, as it will occur only when the car is in motion, and can be heard with the engine turned off. Static eliminators installed in the front and rear wheels, transmission ground straps, grounds installed on torque tubes and on muffler tail pipes have to be resorted to in order to eliminate this noise. Tire inflation also enters into the picture, as under-inflated tires cover more road surface and therefore increase tire static.

Most of the present-day automobile radio sets do not require suppressors on the spark plugs, and employ a suppressor only on the distributor high tension wire. Spark plug suppressors should be avoided if possible, as they are inclined to interfere with engine performance. Low tension distributor wires that travel to the distributor parallel with the high tension wire sometimes have to be shielded to prevent breaker point interference. Spark plug and distributor wires that are carried in metal tubes present a source of trouble for the radio, and best results have been obtained when the wires have been removed from the tube, and if necessary shielded individually. If the coil is located on the instrument panel, the high tension wire should be shielded.

(Continued on page 81)

Interference—

When You Tackle Radio Installations. Here's How To Do It!

types of disturbances that are to be considered in the installation of an automobile radio. The first of these, called chassis pickup, is the noises that are transmitted to the loud speaker through faulty mechanical installation of the set. Poor ground connections at the chassis mounting studs, loose wire connections, poor ground connections at condensers and loose wires in the distributor cap or a partially discharged battery are responsible for the majority of this class of noise. The battery acts as a large electrolytic condenser, and when it becomes run down it loses its power to bypass noises generated by the engine and the generator. Chassis

pick-up noises are audible in the set with the radio antenna disconnected, and when attempting to eliminate the noises from any radio, it is advisable to first disconnect the antenna lead-in and classify the noise. Chassis pick-up noises should be eliminated first.

The second group of noises is classed as antenna pick-up, and consists of ignition interference picked up by the antenna lead-in, and are most noticeable when the aerial is connected to the speaker. Good condensers with good grounds, clean and properly spaced spark plugs, clean and properly spaced breaker points, clean and tight connections at ground straps, with shielding

Profitable Ideas

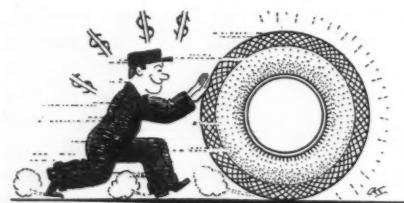
By Frank P. Tighe

Steps to Retread Profits

TWELVE months after Clyde S. Walton had installed retreading equipment in his service station at Lansdale, Pa., his gross business on retreads had totaled \$10,000, and the business has continued on a profitable basis ever since.

"Our policy is to guarantee our tread for at least 10,000 miles of service," Walton tells us, "and we have yet to make good on a tire that did not give this guaranteed mileage. We can make this guarantee because we do not retread a casing that is not worth the cost of a new tread. This is important because we do not guarantee the casing itself, and for that reason we take special care to select only unbroken tires.

"When a customer brings a tire to the shop for a new tread we put it on the spreader, examine it carefully and frankly tell him whether it is worth retreading.



"If we have to tell a customer that we do not care to retread his tire because it is likely to prove unsatisfactory, we offer to sell him a retreaded tire out of our stock. This will cost him only 75c. more than the price of retreading his old tire.

"Some customers prefer to trade in their old casings, taking an allowance to apply on one of our stock tires. We are glad to trade in any good casings because we are always in the market for any trade-ins of good condition that are brought to the shop."

Time Payment Plan

ST. LOUIS auto repair shop operators who have adopted a new low cost budget repair plan sell maintenance on a new plan of low finance charges available to car owners, and immediately after the job is completed the garage operator is paid in cash for the full amount of the repair bill.

AGENTS LOAN APPLICATION		
To Auto Money Corporation:		
Herewith, am sending to 3152 Locust Street 3612 Gravois Avenue 17170 Manchester Avenue		
Mr. _____	Residing at _____	
to arrange for a loan of \$_____ for which he has applied		
at my agency at _____ The applicant owns a		
Make of Car _____	Year _____	Body Type _____
Phone 224 Agent, Auto Money Corporation.		

The cost of the loan to the car owner is 10 per cent flat. For example if the repair job costs \$60. the loan charge is \$6. or a total of \$66. No extras. Six months to pay and weekly payments are arranged.

When the repair job is finished, the auto owner is requested to sign a statement that the car is mechanically acceptable. The finance company's check is made payable to the car owner and the garage operator and the former endorses it over to the latter.

The garage operator has no responsibility in collections, or in the failure of the customer to make regular payments. The finance company takes title to the car when it agrees to loan the money needed. The customer makes his payments at the offices of the finance company.

There is a minimum of red tape.



The customer is driven to one of the three conveniently located branches makes a formal application (see center column) a loan and gives three credit recommendations and he is through. Or the car owner can fill out a loan application at the repair shop office and take it to a finance company office for consideration. If his credit is good the garage operator goes ahead with the job.

Frank Herlitz, shown in the lower left hand corner of the page, operator of the Broadway Motor Inn, St. Louis, was one of the first to take hold of the new repair-financing plan. He is seen with the display banner which helps him sell more repair jobs on the time-payment plan.

Free Daily Papers

LONG a main highway leading into Philadelphia, a new gaso-line service station opened about a month ago, in Upper Darby, Pa.

The manager of this super service station came upon an idea that helps him get acquainted with car owners in his immediate neighborhood and makes them regular customers at his gas pumps and lube pits.

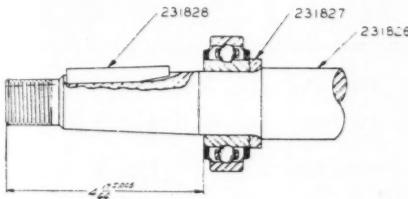
He uses a large circular display sign (see below) to advertise that daily papers would be given away free to his regular customers. It doesn't cost him very much to supply these and the whole bill is charged off to advertising. Nevertheless, within 30 days, the service station operator has handed out 50 papers every day—which means he picked up 50 regular customers within the first month in his new location.

The important point in this simple merchandising plan is that the idea continually feeds the service department with a string of daily prospects for quick service work. Try that in your own neighborhood.

Service Hints

From the Factories

A NEW design axle shaft has been used in production of the 1936 Oldsmobile, and will be supplied for replacement for the 1935 models. The new shaft uses a shorter key way and a shorter key with the inner bottom



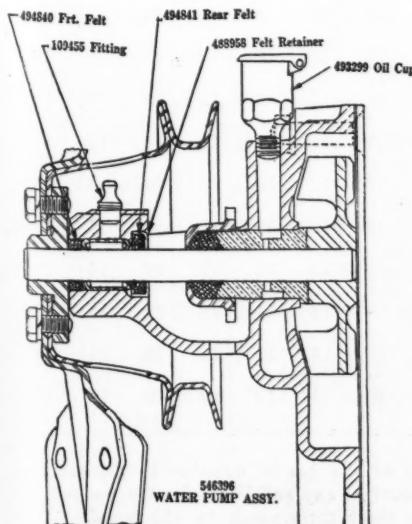
end tapered. The shoulder on the shaft at the inner face of the wheel bearing has been moved away from the bearing face. This allows the machining of a larger fillet at the shoulder which requires the use of a spacing collar between the shoulder on the shaft and the inner face of the bearing.

* * *

SHOULD a squeak develop in the oil pump of the 1936 Graham, a small amount of kerosene or light oil added to the water in the radiator will be found to be effective in eliminating the noise.

* * *

A NEW water pump assembly is being supplied both as a service part and in production of the 1936 Pontiac. The new pump uses a needle



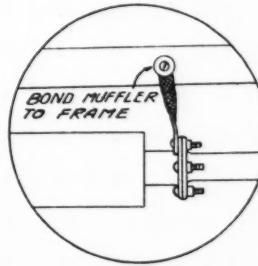
bearing in the front and a large oil cup reservoir has been provided for the rear bushing. The front bearing is provided with a lubrication fitting, and should be lubricated with a small amount of chassis lubricant every 1000 miles. The oil reservoir for the rear bushing should be filled with light engine oil every 1000 miles.

* * *

CASES of excessive oil consumption of 1936 Graham engine have been found to be caused by an excessive supply of oil in the crankcase. This may have been brought about through failure of the dipstick gage to register "Full" when five quarts of oil were put into the crankcase. If the dipstick is found to be incorrect, it should be replaced with one that registers "Full" when the crankcase contains five quarts of oil.

* * *

TO eliminate ignition interference in the radio of the 1936 Studebaker President models, install a



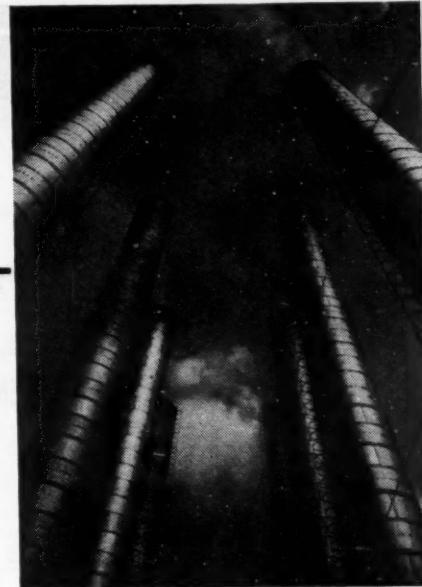
ground strap from the clamp just ahead of the muffler to the frame.

* * *

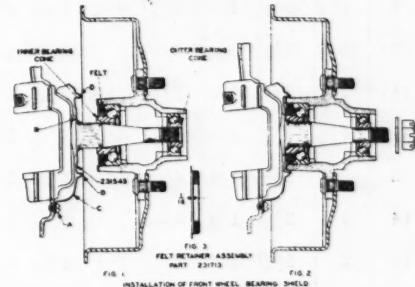
MUFFLERS used on the 1935 and 1936 Pontiac models have a small hole drilled in the outer shell at the rear to allow condensation to drain out. When installing a new muffler, be sure that the hole is placed on the under side and at the lowest possible position.

* * *

A CORRECTION for water entering front wheel bearings of the 1936 Oldsmobile consists of an additional steel shield in conjunction with the



present oil shield on the inside of the backing plate. The additional shield slides over the wheel spindle, the inner diameter being locked between the



wheel bearing inner cone and shoulder of the spindle, and the outer diameter piloting tightly into the large circular opening in oil shield "C."

* * *

AIR leaks under the cowl on the 1936 Studebaker models can be corrected by sealing both sides of the cowl where it joins the dash at points where it is not spot welded. Close the joint with a hammer, and seal with deck sealing cement. The openings at the indenture at each side of the cowl for the hood hinge should be closed by hammering the metal in.

* * *

THE oil pump bearings of the 1936 Graham 90, 90-A and 110 models require lubricating with light engine oil, but the Crusader model requires no lubrication, the bearing having been lubricated when constructed.

* * *

VIBRATION or bucking noises caused by the floor of the rear compartment in the 1936 Studebaker models may be eliminated by installing a piece of sponge rubber between the trunk floor and the gasoline tank. Pry up the floor pan over the tank, and insert the rubber, coated on one side with cement.

Anti-Freeze

Quarts of Anti-Freeze Required

(With Specific Gravity of Solutions at 60° Fahr.)

TEMPERATURE EXPECTED (FAHR.)

Cooling System Capacity in Qts.	20° ABOVE			10° ABOVE			ZERO			10° BELOW			20° BELOW			30° BELOW							
	*ALCOHOL Sp. Gr. .9780	E. GLYCOL Sp. Gr. 1.00	METHANOL 100%	*ALCOHOL Sp. Gr. .9700	E. GLYCOL Sp. Gr. 1.080	METHANOL 100%	*ALCOHOL Sp. Gr. .9600	E. GLYCOL Sp. Gr. 1.040	METHANOL 100%	*ALCOHOL Sp. Gr. .9500	E. GLYCOL Sp. Gr. 1.050	METHANOL 100%	*ALCOHOL Sp. Gr. .9400	E. GLYCOL Sp. Gr. 1.120	METHANOL 100%	*ALCOHOL Sp. Gr. .9300	E. GLYCOL Sp. Gr. 1.065	METHANOL 100%					
	20° ABOVE	10° ABOVE	ZERO	10° BELOW	20° BELOW	30° BELOW	20° ABOVE	10° ABOVE	ZERO	10° BELOW	20° BELOW	30° BELOW	20° ABOVE	10° ABOVE	ZERO	10° BELOW	20° BELOW	30° BELOW					
6	1 1/4	1	3/4	1 3/4	3	1 1/2	1 1/4	2 1/2	4	2 1/4	1 1/2	2 3/4	4 1/2	2 1/2	2	3	4 3/4	2 3/4	2 1/4	3 3/4	5 1/2	3	2 1/2
7	1 1/2	1 1/2	3/4	2 1/4	3 1/2	1 3/4	1 1/2	2 3/4	4 1/2	2 1/2	2	3 1/2	5 1/4	3	2 1/4	3 1/2	5 1/2	3 1/4	2 3/4	4 1/4	6 1/2	3 1/2	3
8	1 1/2	1 1/2	1	2 1/2	4	2	1 3/4	3 1/4	5 1/2	2 3/4	2 1/4	4	6	3	2 1/2	4 1/2	7	3 1/2	3	4 1/2	7 1/4	4	3 1/2
9	1 3/4	1 3/4	1	2 3/4	4 1/2	2 1/4	2	3 1/2	6	3	2 1/2	4 1/2	7 1/2	4	3 1/2	3	4 1/2	7 1/4	4	3 1/2	5 1/2	8	4 1/2
10	2	1 3/4	1 1/4	3	5	2 1/2	2	4	6 1/2	3 1/2	2 3/4	4 3/4	7 1/2	4	3 1/4	5 1/2	8	4 1/2	3 3/4	6	9	5	4 1/4
11	2 1/4	2	1 1/2	3 1/2	5 1/2	2 3/4	2 1/4	4 1/2	7 1/4	3 3/4	3	5 1/4	8 1/2	4 1/2	3 1/2	5 3/4	9	5	4 1/4	6 1/2	10	5 1/2	4 1/2
12	2 1/2	2 1/4	1 1/2	3 3/4	6	3	2 1/2	4 3/4	7 3/4	4 1/4	3 1/4	5 1/2	9	4 3/4	4	6 1/2	9 1/2	5 1/2	4 1/2	7 1/2	11	6	5
13	2 1/2	2 1/2	1 3/4	4	6 1/2	3 1/4	2 3/4	5 1/4	8 1/2	4 1/2	3 1/2	6	10	5 1/4	4 1/4	7	10 1/2	6	5	8 1/2	11 1/2	6 1/2	5 1/2
14	2 3/4	2 1/2	1 3/4	4 1/2	7	3 1/2	3	5 1/2	9	5 1/4	3 3/4	6 1/2	10 1/2	5 1/2	4 1/2	7 1/2	11	6 1/2	5 1/4	9	12 1/2	7	6
15	3	2 3/4	2	4 1/2	7 1/2	3 3/4	3	6	9 3/4	5 1/2	4	7	11 1/2	6	5	8	12	6 3/4	5 3/4	9 1/2	13 1/2	7 1/2	6 1/2
16	3 1/4	2 3/4	2	4 3/4	8	4	3 1/4	6 1/2	10 1/2	5 3/4	4 1/4	7 1/2	12	6 1/2	5 3/4	8 1/2	13	7 1/4	6	10	14 1/2	8	6 3/4
17	3 1/2	3	2 1/4	5 1/4	8 1/2	4 1/4	3 1/2	6 3/4	11	6	4 1/2	8	13	7	5 1/2	9	13 1/2	7 1/2	6 1/2	10 1/2	15 1/2	8 1/2	7 1/4
18	3 3/4	3 1/4	2 1/4	5 1/2	9	4 1/2	3 3/4	7 1/4	11 3/4	6 1/4	4 3/4	8 1/2	13 1/2	7 1/4	6	9 1/2	14 1/2	8	6 3/4	11	16	9	7 1/2
19	4	3 1/2	2 1/2	5 3/4	9 1/2	4 3/4	4	7 1/2	12 1/2	6 1/2	5	9	14 1/2	7 1/2	6 1/4	10	15	8 1/2	7 1/4	11 1/2	17	9 1/2	8
20	4	3 1/2	2 1/2	6	10	5	4 1/4	8	13	7	5 1/2	9 1/2	15	8	6 1/2	10 1/2	16	9	7 1/2	12	18	10	8 1/2
21	4 1/4	3 3/4	2 3/4	6 1/2	10 1/2	5 1/4	4 1/4	8 1/2	13 1/2	7 1/2	5 3/4	10	16	8 1/2	6 3/4	11	17	9 1/2	8	13	19	10 1/2	9
22	4 1/2	4	2 3/4	6 3/4	11	5 1/2	4 1/2	8 3/4	14 1/2	7 3/4	6	10 1/2	16 1/2	8 3/4	7 1/2	11 1/2	17 1/2	10	8 1/4	13 1/2	20	11	9 1/4
23	4 1/2	4 1/4	3	7	11 1/2	5 3/4	4 3/4	9 1/4	15	8	6 1/4	11	17 1/2	9 1/4	7 1/2	12	18 1/2	10 1/2	8 3/4	14	21	11 1/2	9 3/4
24	4 3/4	4 1/4	3	7 1/4	12	6	5	9 1/2	15 1/2	8 1/2	6 1/2	11 1/4	18	9 1/2	8	12 1/2	19	10 3/4	9	14 1/2	21 1/2	12	10
25	5	4 1/2	3 1/4	7 1/2	12 1/2	6 1/4	5 1/4	10	16 1/2	8 3/4	6 3/4	11 1/2	19	10	8 1/4	13	20	11 1/4	9 1/2	15	22 1/2	12 1/2	10 1/2
26	5 1/4	4 3/4	3 1/4	7 3/4	13	6 1/2	5 1/4	10 1/2	17	9	7	12	19 1/2	10 1/2	8 3/2	13 1/2	21	11 3/4	9 3/4	16	23 1/2	13	11
27	5 1/2	5	3 1/2	8 1/4	13 1/2	6 3/4	5 1/2	11	17 1/2	9 1/2	7 1/4	12 1/2	20	11	8 3/4	14	22	12	10 1/4	16 1/2	24 1/2	13 1/2	11 1/2
28	5 3/4	5	3 1/2	8 1/2	14	7	5 3/4	11 1/4	18 1/4	9 3/4	7 1/2	13	21	11 1/4	9 1/4	14 1/2	22 1/2	12 1/2	10 1/2	17	25	14	11 3/4
29	5 3/4	5 1/4	3 3/4	8 3/4	14 1/2	7 1/4	6	11 3/4	19	10	8	13 1/2	22	11 1/2	9 1/2	15	23 1/2	13	11	18	26	14 1/2	12 1/4
30	6	5 1/2	3 3/4	9	15	7 1/2	6 1/4	12	19 1/2	10 1/2	8 1/4	14	22 1/2	12	9 3/4	15 1/2	24	13 1/2	11 1/4	18 1/2	27	15	12 1/2
31	6 1/4	5 3/4	4	9 1/2	15 1/2	7 3/4	6 1/2	12 1/2	20	10 3/4	8 1/2	14 1/2	23 1/2	12 1/2	10	16	25	14	11 3/4	19	28	15 1/2	13
32	6 1/2	5 3/4	4	9 3/4	16	8	6 1/2	13	21	11 1/4	8 3/4	15	24	13	10 1/2	16 1/2	26	14 1/2	12	19 1/2	29	16	13 1/2

To determine the amount of anti-freeze required for any car, find the cooling system capacity of the car in question in the table at right. Then by selecting the corresponding figure in the first column in the table above, the amount of any anti-freeze for the temperature expected may be found by following the column across the page. *The alcohol listed in the chart corresponds to 188 proof. When alcohol of 200 proof is used, reduce the amounts listed in the table by 10 per cent.

Facts and Figures

		Cooling System Capacities by Makes and Models						
	Quarts		Quarts	Quarts	Quarts		Quarts	
AUBURN	76, 1928	15	Six, 1930	12	Six, 1933	17	Adv. Amb., 1932,	1930 13
	88, 1928	16	8, 1930, 6, 1931	16	8, 1934, 1935,	1932 25	1933, 1934 15	
	115, 1928	20	Del. 8, 1930, 31	19	1936	23	6, 1935 13½	
	6, 1929, 1930	19			6, 1935	19	8, 1935 14	
	8-90, 8-95, 1929				6-63, 1936	13	Std. 1933, Spe., 1936 15	
	1930	22					1933 16	
	120, 125, 1929,						8, 1936 16%	
	1930	25	Imp. 8, 1930,	26				
	8-98, 1931	21	1931	26				
	8, 1932, 1933	19	Six, 1932, '33, '34	16	HUPMOBILE		REO	
	6-52, 1934, 1935	17½	Roy. 8, 1933	19	M-8, M	22	T6, 1924, 1925 14	
	8-50, 1934, 1935	21	Imp. 8, 1933	20	S, 1929	13	Fly. Cloud, 1928 16	
	12, 1932, 33, 34	37	Imp. Cust. 8,		S, S-2, 1930-'31	14	Wolv., B2, Fly.	
	6-654, 1936	16	1933	27	C, 1930, 1931	20	Cloud, 1929 14	
	8-852, 1936	20	Roy. 8 CU, 1934	23	H, U, 1930, 1931	28	15, 1930 14	
AUSTIN	1931 to 1936	6	CV, CX, 1934	23	L, 1930, 1931	16	C Fly. Cloud, 20,	
			6-C6, 1935	17	216, 1932	13	25, 1929, 30 19	
			8-CZ, 1935	20	222, 1932; 332,		Amb. Super 8,	
			8-C1, C2, C3,		1934	21	6-21, 6-25, 1931 17	
BUICK			1935	19	226, 1932; 326,		8-21, 8-25, 1931,	
	Std. 1926-1927	12	CW, 1935	24	1933	24	1932 16	
	Master, 1926-27	18	6-C7, 1936	19	321, 1933	21	8-31, 8-35, 1931 23	
	115, 1928	16	8-C8, 1936	22	417, 1934, 421-J,		S, 1932, 1933 20	
	116, 40, 1928,		8-C9, C10, C11,		1934	16	Royale, 1932, 33 23	
	1929, 1930	17	1936	17	427, 1934	24	S4, 1934 19	
	120, 128, 1928	20			518, 1935	20	Fly. C. 1935,	
	121, 129, 1928-29	22	St. 8, 1930	11	6-618G, 1936	18	1936 18	
	50, 60, 1930	22½	St. 8, 1931	13	8-621N, 1936	21½	Roy. 1935 20	
	40, 1930	17	Six, 1931, 1932	15	LAFAYETTE		STUDEBAKER	
	8-50, 1930 to		Six, 1933	16	321, 527, 1935	24	Std. all 17	
	1933	12	Six, 1934	20	6-618G, 1936	18	Spe., 1925, 1926 18	
	8-60, 1930 to		Six, 1935	17	8-621N, 1936	21½	Big 6, 1926, 27 19	
	1933	16	Six, 1936	19	1934, 1935, 1936	19	Dict., 1928 14	
	8-80, 8-90, 1930		DODGE		1934, 1935, 1936	19	Com., 1928 20	
	to 1933	19	1924 to 1928	11	328, 1929	21	Pres., 8, 1928 20	
	40, 1934	14			340, 1930; 345,		Dict., 6 & 8, 15	
	50, 1934, 1935	15½	St., 1928	13	1931	24	1929 15	
	60, 1934, 1935	18	Senior six, 1928,		1932, 1933	26	Com., 6, 1929 17	
	90, 1934, 1935	23	1929	17	St. 8, 1934, 1935	18	Com., 8, 1929, 1930 21	
	40, 1935	13	Vict. 6, 1928	12	8-36-50, 1936	16½	1931 21	
	40, 1936	13½	Six, 1929, 1930	16	LINCOLN		Six, 1930, 31, 32 12½	
	60, 80, 90, 1936	17	8, 1930	17½	1925 to 1927	30	Dict. 8, 1930, 31 18	
CADILLAC	314, 1926-1927	22	Six, 1931, 32, 33	14½	1928 to 1930	32	Com., 70, 1931 14	
	341A, 341B, 355,		16		8, 12, 1931 to		Dict., 62 14	
	353	24	Six, 1934	18½	1933	34	Com. 71 16	
	452, 1930, 31	28	Six, 1935	17	12-1934, 1935,		President 91 21	
	370, 1931	26	6-D2, 1936	14	1936	32	Six 56, 1933 14	
	8, 1932, 33	26	ESSEX		1936		Com., 1933 16	
	12, 1932, 1933	24	Six	19	LINCOLN ZEPHYR		Pres. 82, 1933 18	
	16, 1932, 1933	28	Super six, 1932	17	H-901, 1936	27	Pres. 92, 1933 23	
	355-D, 1934		FORD		MARMON		Dict. 6, 1934 15½	
	1935	20	T. A. B	12	6, 1924 to 1927	22	Com. 8, Pres. 8 18½	
	370D, 1934,		V-8, 1932, 33, 34,		68, 1928	18	Dict. 6, 1935 16½	
	1935	19	36	22	68, 78, 1929	20	Com., 1935 21½	
	452-D, 1934,		V-8, 1935	20	Roosevelt, 8-69	16	Pres., 1935 21½	
	1935	23			8-79, Big 8, 1930	28	Dict., 1936 14	
	V8-60, 1936	30	GRAHAM		70, 1931	16	Pres. 1936 17	
	V8-70, 75, 1936	29	Std. 6, 1930	18	88, 1931; 8-128,			
	V12-80, 85, 1936	19	Spec. 6, 1930,		1932	28		
	V16-90, 1936	24	1931	20	16, 1931, 1932	29		
CHEVROLET			Spe. Std. 8	26	16, 1933	34		
	1926, 1927, 1928,	8	Cust. 8-34, 1931	26	MARQUETTE			
	1929 to 1933	10	8, 1931 to 1934	20	1929	12		
	Std. 1934, 1935	10	6-74, 1935	15	NASH			
	Master 1934,		6-73, 1935	17½	Adv., 1927, 1928	22		
	1935	11	8-72, 1935	18	Spe., 1927	20		
	Std. & Master,		8-75, 1935	20	Spe., 1926	16		
	1936	15	6-80, 1936	11	Adv. 6, 1929	19		
			6-90, SC 110,		Std. 6, 1929	10		
			1936	15	Spe. 6, 1929	17		
CHRYSLER	52, 66, 1929	14	GRAHAM-PAIGE		Single 6, 6-60,			
	60, 1926	12	610, 614, 615	20	960	12		
	62	11	619, 629, 835	26	8-70, 1930	15		
	70, 1925, 26, 27	16	612, 1929	18	970, 1931	13		
	72	17	621, 1929	25	8-80, 1930	16		
	80, 1926, 1927	20½	827, 837	27	980, 1931	20		
	65	13			Twin 8, 8-90,			
	75	15	HUDSON		990	22		
	70, 77	21	1928, 1929	22	Big 6, 1932	17		
	Imp. 80	21	8, 1930 to 1933	18	Spe. 8, 1932	21		
					PLYMOUTH			
					Up to 1931	14		
					1932	15		
					1933	13		
					1934	14		
					1935	15		
					1936	15		
					WILLYS			
					Six	14		
					Eight	20		
					77, 1933-36	9		
					VIKING			
					1929, 1930	33		
					1931	16		
					1932	13		
					1933	18		
					1934	38		
					8-845, 1935	28		
					12-1245-55, 1935	40		
					8-1601, 1936	25		
					12-1602-03, 1936	38		
					WILLYS KNIGHT			
					66, 1927 to 1930	21		
					70, 1926 to 1929	17		
					87, 1930	17		
					70A, 1928	16		
					66D, 1931, 1932	17½		
					95, 1931, 1932	15½		

Maintenance Men Meet

Don Herr Reelected Board Chairman At

Annual I. G. & M. A. Meeting in Chicago

Jobber-dealer relationship; combatting chain store competition; slot-machine parking; service selling and the future of the parking garage, were among the highlights of many interesting talks delivered at the an-

nual meeting of the International Garage and Maintenance Association held at Chicago on September 21-23. Members from eight different states attended and in addition to joining in the discussions visited various Chicago safety lanes and studied service methods.

At the business meetings of the association it was decided to appoint chairmen of 13 zones throughout the United States. These zone chairmen in turn were to appoint state chairmen who would then appoint five counsellors to serve with him to form a national membership and organization committee.

Don Herr, Indianapolis, was re-elected chairman of the executive council; Charles Berg, Kansas City, President; Ralph W. Robinson, Minneapolis, Secretary; Herman Koppelman, Chicago, Treasurer; Earl Sadler, Chicago, Executive Secretary, and L. G. Wilcox, Minneapolis, Chairman Organization Committee.

At one of the luncheons, B. W. Ruark, general manager of the Motor and Equipment Wholesalers Association, told the members of the I. G. and M. A. that "things were working together for the good of the independent maintenance industry, pointing out the enactment of the Robinson-Patman act and the West Virginia Chain Store law. Mr. Ruark also emphasized the relation between independent repairmen and automotive jobbers and pointed out how these two great sections of the automotive industry are going forward hand and hand.

Parts Shipped by Air

More than 2700 shipments of automobile parts and tires were air-expressed during July, according to a report issued by the air express division of Railway Express Agency. Shipments were about evenly divided between replacement parts sent to service stations and production parts sent to assembly plants experiencing sudden shortages. Scores of license plates are being flown each month to purchasers taking delivery of cars away from home.

The Pictures, Down the Column:

Where has the oldtime blacksmith gone? Into the repair shop! At least that's what 74-year-old Charley Harned has done. He has worked in the J. H. Germershausen, Inc., shop, Plainfield, N. J., for 20 years.

Vincent Bendix, manufacturer and aviation sponsor, congratulates Mrs. Louise Thaden, Bentonville, Ark., who won the recent Bendix Air Trophy, flying from New York to Los Angeles in 14 hours and 55 minutes.

It's not a toy—it's a "miniature midget" introduced recently in England, for which its maker claims 80 miles on a gallon of gas.

The airplane-bicycle entered in the competition at the annual exhibition of inventions in Paris.

Olympic Motors Takes Over Old Franklin Plant

Transfer of the Franklin automobile plant in Syracuse to the recently incorporated Olympic Motor Car Co., Inc., of Syracuse, was announced this week by Ben Wiles, Syracuse attorney, who has been conducting negotiations. Arthur J. Brandt, Detroit industrial engineer, Alfred R. Glancy, of Bloomfield Hills, Mich., formerly a vice-president of General Motors and John E. Williams, of Syracuse, are among the directors of the new company.

The Olympic Motor Car Co., Inc., filed a certificate of incorporation in New York State with H. P. Leonard, of Toledo, president of Franklin Motors, Inc., George W. Ritter, Toledo, vice-president of that concern, and Irving J. Davis, Syracuse, as directors. Mr. Davis is an associate of Mr. Wiles. It was stated officially that this new corporation was to serve as an intermediary in the transfer of the old Franklin plant to new interests.

The new Olympic company's stockholders have not yet held any meetings and it is said that the entire matter is still in the formative stage. It is not known whether Olympic will continue to be the operating concern when the plant is reopened or whether some other company or name will be used.

It was reported that the plant would be used to manufacture small low-priced cars and possibly trailers.

Diamond T to Build Light Diesel Truck

A light 6-cylinder 1-1½-ton Diesel engined truck is being built for export by the Diamond T Motor Car Co., according to a statement by C. A. Tilt, president of the company. Cable announcement that the company was ready to make shipments of the truck brought immediate and substantial orders from South Africa, Turkey, and a number of European countries, it is said.

The new Diesel truck will be announced in this country for the first time during the automobile shows in November, and will be exhibited at the Chicago show. This is the first light Diesel engined truck to be built in this country, it is said.

Down the Column:

Lloyd Logan was only slightly injured when flung from the seat of his racing car at Oakland, Calif., recently.

An aerial photograph showing the Ford Motor Co. enterprises at Dearborn, Mich. Note the new Ford Rotunda, built for visitors, in the foreground.

Louis Unser, who won the 1936 Pike's Peak climb in the Perry Sealed Power Special. Complete details on page 45.





"WILD BILL" CUMMINGS flies across the starting line, breaking a white band of ribbon—and the new Roosevelt Raceway is officially opened. This function took place, Sept. 8, when the new 4-mile track was dedicated at Westbury, L. I.

On the left is the new George Vanderbilt cup. George P. Marshall, George Vanderbilt and Captain Eddie Rickenbacker (left to right) are pictured with the perpetual trophy that Vanderbilt has donated as a prize for the winner of the Columbus Day race.

Time trials were under way for the big event, as MOTOR AGE went to press. Complete details of the race will appear in the November issue.



Jenkins Resets Speed Records at Bonneville

"Ab" Jenkins, America's ace distance record holder, took some of the "sting" from the wholesale speed achievement of Captain George Eyston at Bonneville Saltbed on September 23 when he completed his 48-hour record assault with an average 10 miles per hour faster than the pace maintained by the Britisher.

Jenkins, with 66 records under his belt, was credited with a speed of 148.63 miles per hour for the 48 hours. Eyston maintained a gait of 136.34 miles per hour for the 48 hours when he established a long string of 113 records in July.

Also in the recent tussle for Eyston's records was John Cobb, fellow countryman of Eyston, who established 52 records from September 9 to 13 with his powerful Napier-Railton Special he used at Bonneville last year.

For a few days Cobb held the 24-hour mark, but Jenkins annexed this important record in a resumed assault on the group of marks after experiencing motor trouble in his initial attempt of the season on September 7. Jenkins at that time traveled 1940 miles and established 52 records before a universal went bad and it was necessary to make immediate replacements before carrying on. He went out again on September 21, after Cobb had completed his 24-hour run, and established 14 more records, eclipsing a number of records he had set two weeks before.

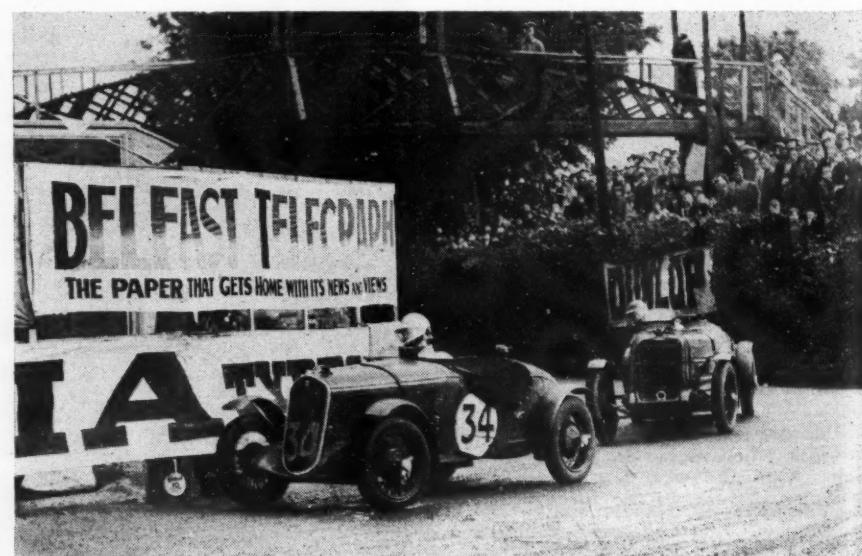
Jenkins, in establishing his newest

records, drove his newest speed creation, a twin-motored "Mormon Meteor" powered by a pair of 12-cylinder Curtis Conqueror airplane engines. The car he drove in 1935 at Bonneville was less powerful design and was catalogued in Class "B." It was a Duesenberg Special.

Jenkins newest records were made in the following brackets: World's Unlimited, 17 records; International Class "A," 17; American Unlimited, 16; American Class "A," 16. Cobb's (Continued on page 50)

Servicemen Hear Bill Toboldt

Bill Toboldt, Editor of MOTOR AGE was guest speaker before a large group of Pennsylvania servicemen, when Aero Oil Co. service station operators met at Lancaster, Pa., Sept. 10. Dave DeTor, president of the Aero Oil Co., distributors of Fleetwing gasoline and lubricants in Lancaster, Adams and York counties presided over the get-together. Dave Morris of Lancaster Auto Parts Co. helped with the evening's arrangements.



FOR the second year in succession, Freddie Dixon, driving a Riley, at an average speed of 78.01 miles an hour, over the 410-mile Ards Circuit, won the Royal Automobile Club International Tourist Trophy race at Belfast, Ireland, Sept. 6.



FAREWELL to summer! Yes, that's a very nice title for this picture. Goodbye to summer sunshine, bathing beauties, beach parties and all of that! Sometimes, we wonder what photographers do in the winter—without that "certain something" they get into their summer pictures. By the way, that's a Pontiac "Chieftain" which is a very important part of this particular photo.



A SUPER - super - serviceman! Fred J. Pebbley of Pueblo, Colo., with his 430 lbs. of brawn, fears not the crankiest motorist, nor does he object to being one of the points of interest in that section of the country.

Record ASI Show for Space and Number of Exhibits

The 1936 Automotive Service Industries Show, to be held on Navy Pier, Chicago, Dec. 9 to 13, has broken all of its own records for number of exhibitors and amount of display space required, according to results of the space drawing in Chicago, Sept. 11, under the auspices of the joint show operating committee, representing the three sponsoring associations.

According to requests for room reservations received by headquarters hotels, some of which have been completely sold out, jobber attendance this year also will set new highs.

The 344 manufacturers of parts, accessories, tools, equipment, and maintenance supplies who participated in the drawing were awarded a total of 922 booths requiring 97,801 sq. ft. of display space. The 1935 A.S.I. Show in Atlantic City had set the previous high with exhibits requiring 87,844 sq. ft.

The 1936 show, as in previous years, will be open only to jobbers who are members of one of the sponsoring associations or whose names have been placed on an invitation list approved by the credentials committee. Member jobbers are eligible to attend

throughout the entire show period, but to earn the \$25 attendance rebate they must attend on the first three days, Dec. 9, 10 and 11. Invited non-member jobbers may attend the show on the last three days, Dec. 11, 12 and 13 and on the last day the show also will be open to the retail repair and maintenance trade by invitation of jobber members in the Chicago area.

The sponsoring associations will also hold their annual conventions in conjunction with the show. This year the National Standard Parts Association will hold its convention on Dec. 7 and 8 at the Sherman Hotel; the Motor and Equipment Wholesalers Association on the same dates at the Stevens Hotel; and the Motor and Equipment Manufacturers Association on Dec. 10 at the Blackstone Hotel.

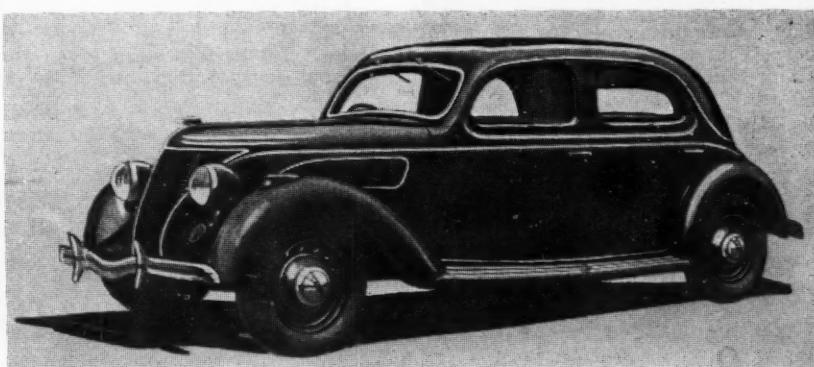
Bear to Align Racers At Roosevelt Raceway

The Bear Manufacturing Company, Rock Island, Ill., has been invited by the Roosevelt Raceway officials to be on hand with Bear Alignment Equipment to provide alignment service to all entrants in the Vanderbilt Cup classic.

New British Ford

Smaller V-8 Engine Has Higher Compression Ratio

Ford Motor Co. Ltd., of Great Britain has announced a 22-hp. V-8 with 2.6 in. by 3.2 in. cylinders (136 cu. in.). The price has been reduced from £235 to £210, the wheelbase has been reduced from 112 to 108 1/4 in., a new frame is used which is 2 1/2 in. lower, and both front and rear transverse springs are located out from the axles so as to give a longer springbase. All gears in the transmission are now of the silent type, instead of only those of second speed. The combustion-chambers in the aluminum cylinder heads have been improved in form and a compression ratio of 6.64 to 1 is now used. The rear-axle ratio is now 4.55 instead of 4.77 on the old model, this reduced ratio being justified by the greater engine power and the lower car weight. An important improvement is said to have been made in the inlet manifold which, as before, is located centrally between the two banks of cylinders.



THE new British Ford V-8 has a new engine with a bore of 66 mm. (2.6 in.) and stroke of 81.2 mm. (3.2 in.) with a rating of 22 hp. General design of the engine is similar to the British 30 hp. type, with aluminum cylinder heads and a compression ratio of 6.64 to 1



NOW that America is about to witness the revival of Vanderbilt Cup Racing, let's see what the first William K. Vanderbilt cup races looked like. Taken in 1904, the year of the first race, the pictures show (left) the start of the small car class races and (right) going around a hairpin turn on the Nassau County, N. Y., oldtime race course. Present day Vanderbilt races will be held on a modern "made-to-measure" road racing course.

German Flying Boats Cross Atlantic

**Diesel-Powered Ships Require Catapults for Taking Off;
Came by Way of Azores**

Two Dornier flying boats of the German Lufthansa arrived at Port Washington, L. I., from the Azores last month. The purpose of the flights was to obtain first-hand information regarding wind and weather conditions along the southern route across the North Atlantic in preparation for the inauguration of a regular commercial service at a later date. The two ships were the Zephyr, piloted by Captain Joachim Blankenburg, and the Eolus, piloted by Captain H. W. von Engel. While the Zephyr flew directly from the Azores to the United States, covering a distance of 2390 miles in 22 hr. 14 min. (108 m.p.h.), the Eolus flew by way of Bermuda, where an overnight stop was made, and covered 2833 miles in 24 hr. 19 min. (116 m.p.h.).

These ships, when carrying a fuel supply sufficient for a transoceanic flight and pay load in addition, are too heavy to take off directly from the water, and both were catapulted from the mothership Schwabenland, which has a catapulting apparatus of sufficient power to accelerate the flying boats from a standstill to 100 m.p.h. in a distance of 100 ft. No passengers,

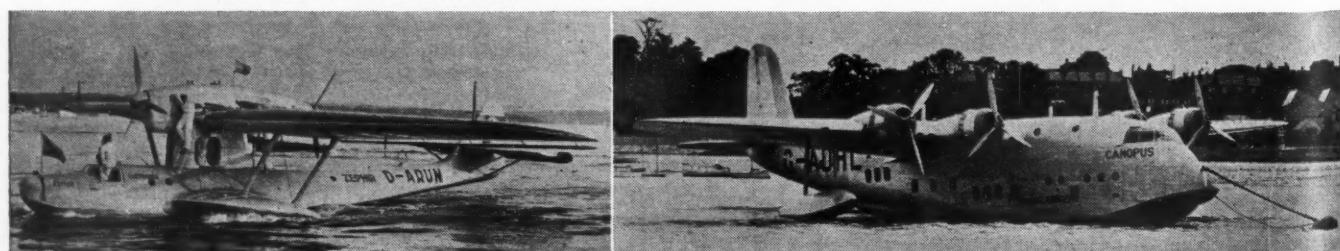
mail or express were carried on these experimental flights. The trial flights were made with the cooperation of the Pan American Airways System, using its base at Manhasset Bay.

Both ships are of the Dornier Do. 18 type, with a wing span of 78 ft., an overall length of 63 ft., and a total height of 17 ft. Each boat is equipped with two Junkers Jumo V two-stroke Diesel engines with a rating of 500 hp. each. The engines are mounted in tandem centrally above the wing, one carrying a tractor and the other a pusher propeller. The Jumo V has a bore of about 4½ in. and the combined stroke of the two pistons in each cylinder is 12½ in., making the displacement 1015 cu. in. Each engine has two crankshafts, one above and the other below the vertical cylinders, and these crankshafts are connected by a train of gears at one end, one of these gears being mounted on the propeller shaft. A great advantage of the Diesel engine for transoceanic flights is its high fuel economy, the consumption of the Jumo V being given as 0.35-0.375 lb. per hp.-hr. under cruising load. No figures were given for the actual consumption during the flight.



New Pines "Custom Bilt" Winter Front Announced

Pines Winterfront Co., Chicago, Ill., has announced a new "Custom Bilt" metal winterfront for Ford, Chevrolet, Plymouth, Dodge and Oldsmobile cars. It has the appearance of a shield, in the center of which are two sliding panels which open to admit air to the radiator. It is said to be easy to install, being held securely against the grille. Retail price \$4.95 for Ford, Chevrolet and Plymouth, and \$5.95 for Dodge and Oldsmobile.



BLAZING an air route over the Southern Atlantic, the ten-ton, Diesel-powered Zephyr (left) landed in the Port Washington, N. Y., harbor after flying 2390 miles from the Azores. The plane was catapulted from a German Air Lines boat. (Right) "Canopus," the giant British flying-boat built for Imperial Airways of England. The craft will accommodate 24 passengers for day travel, 16 for overnight flying. It is designed for trans-Atlantic trips.

Chicago Show to Set New Record for Truck Displays

Setting a new record for both numbers of exhibitors and amount of space taken, 11 truck manufacturers last month drew space to show their 1937 models at the 37th Annual Chicago Automobile Show. Al C. Faeh, show manager, announced the space contracted for at the drawing totaled 35,000 sq. ft.

Show Dates:

30th Automobile Salon, Paris, France	Oct. 1-11
Olympia Motor Show, London, England	Oct. 15-24
Czechoslovakia, 26th International Automobile Exposition, Prague	Oct. 16-25
9th International Automobile Salon, Milan, Italy	November
National Motor Truck Show (N. J. Motor Truck Assn.), Newark, N. J.	Nov. 3-7
Canadian National Automobile Show, Toronto	Nov. 7-14
National Automobile Show, Grand Central Palace, New York	Nov. 11-18
Omaha Automobile Show	Nov. 11-15
Philadelphia Automobile Show	Nov. 12-19
Scottish Motor Show, Glasgow	Nov. 13-21
International Aviation Show, Paris, France	Nov. 13-29
Columbus Automobile Show	Nov. 14-20
Boston Automobile Show	Nov. 14-21
Buffalo Automobile Show	Nov. 14-21
Chicago Automobile Show	Nov. 14-21
Detroit Automobile Show	Nov. 14-21
New Haven Automobile Show	Nov. 14-21
Indianapolis Automobile Show	Nov. 14-21
Washington, D. C., Automobile Show	Nov. 14-21
Cincinnati Automobile Show	Nov. 15-21
St. Louis Automobile Show	Nov. 15-22
Pittsburgh Automobile Show	Nov. 16-21
Brooklyn Automobile Show	Nov. 21-28
Cleveland Automobile Show	Nov. 21-28
Montreal Automobile Show	Nov. 21-28
Kansas City Automobile Show	Nov. 21-29
Milwaukee Automobile Show	Nov. 22-29
Portland Automobile Show	Nov. 22-29
Baltimore Automobile Show	Nov. 26-Dec. 5
28th Automobile Salon, Brussels, Belgium	Nov. 28-Dec. 9
Peoria Automobile Show	Nov. 30-Dec. 5
First International Consumers Petroleum Exposition, Convention Hall, Detroit	Dec. 5-13
Automotive Service Industries Joint Show, Chicago	Dec. 9-13
Illinois Automotive Ass'n, 4th Annual Show and Maintenance Exhibit, Navy Pier, Chicago	Apr. 24-28, 1937



"Lady, your frame is bent!"

Unser Wins Pikes Peak Climb for Second Time

Louis Unser's all-time record for the difficult Pikes Peak Climb survived the assault of nine racing cars during the Labor Day revival of the historic event.

Unser, who holds the all-time record of 16 minutes, 1.8 seconds for the 12 miles and 2200-foot climb established in 1934, drove the Perry Sealed Power Special negotiating the climb nearly a minute faster than second place winner. His time was 16 minutes, 28.2 seconds.

Next, in order, were:

Position	Driver	Car	Time
2nd	Al Rogers	George's Place Special	17:09.6
3rd	Jerry Unser	Jerry Unser Special	17:14.4
4th	Joe Thorne	Miller Special	17:44.4
5th	Walt Killinger	Killinger Special	18:16.8
6th	Bud Martinson	Ford V-8 Special	19:47.8
7th	Marty Keller	Keller Special	19:51.9
8th	Phil "Red" Shafer	Shafer "8" Special	19:56.9
9th	John Mauro	S. O. McDowell Special	18:29.0—Out*

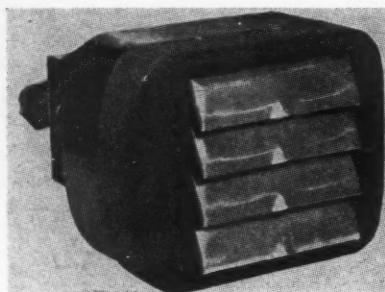
* Engine "died" about 15 yards from finish and car was pushed across finish line—officials ruled car out.



AS the day draws near for the opening of the world's longest bridge (shown on right), establishing a new and shorter traffic link between San Francisco and Oakland, Calif., an Oldsmobile owner sought out California's oldest bridge at Bidwell's Bar on the Feather River (left). Fabricated in Troy, N. Y., in 1853, the bridge was shipped around the Horn to San Francisco, thence to Feather River where it has been in service for 83 years.

Holle Offers New Hot Water Heater

The Holle Supreme Heater Co., Montclair, N. J. has introduced a new hot water heater in the low price field. Powered by a Delco motor with



oil-less bearings, the new heater is said to employ a tubular core for efficient operation, and a six inch four-blade fan provides the air flow which can be controlled by adjustable chromium plated shutters. Dealers price \$4.95.

Briggs Announces New Type Cylinder Head, Rear Axle

The Briggs Manufacturing Co., Detroit, announced two new developments last month. One of these is a composite cast iron and pressed steel cylinder head which is claimed to control carbon formation, improve fuel economy and control detonation. The other is a novel rear axle construction employing torque tube drive and incorporating a Weiss constant velocity joint at the pinion. The object is to produce any desired drop in propeller shaft axis so as to eliminate underbody tunneling without resorting to hypoid gearing. The attachment is so designed as to use the standard rear axle without change.

Keller Joins Chek-Chart

Raymond Shaw, president of The Chek-Chart Corporation, announces the appointment of J. S. Keller as sales director of The Chek-Chart Corporation, 624 S. Michigan Avenue, Chicago.



C. E. SHACKLE, British engineer made a model traction engine and model bridge in order to test an instrument he developed which is said to measure bridge tremors under passing loads. The apparatus shows the effect of different loads and vehicles on a bridge.

Detroit Show to Have Big Trailer Exhibit

At the Detroit show, opening Nov. 14, more than 15,000 sq. ft. in Convention Hall will be devoted to house trailers which will be given an outdoor setting in order that the trailers may be exhibited to best advantage. In addition, there will be on display accessories and equipment ranging from a tiny electric lighting plant to complete sets of trailer furniture, tow-ropes and hydraulic braking systems.

Service School At Kansas City

The automotive Trades Assn. of Kansas City has announced that schedules have been arranged for its 1937 Service School which will get under way early this month. The school program will consist of eight weekly sessions at A. T. A. Hall and will include instruction on all popular service operations.

Timberlake Presents New "Thawit" Gun

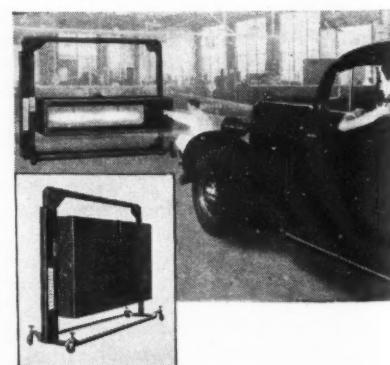
J. B. Timberlake & Sons, Inc., Jackson, Mich., has announced a hot air pressure gun for thawing frozen grease in rear axles and transmissions.



Connection is made to the regular air pressure hose and an electrical connection to any 110 volt socket. The gun is said to provide a blast of air of about 400 deg. temperature in less than one minute.

New Headlight Tester Produced by Bendix

The Bendix Products Corp., South Bend, Ind., has announced the introduction of the Bendix-Feragen headlight tester as a part of their safety inspection equipment. It is described as the screen and tunnel type of tester, portable, with a feature that



permits the screen to be raised or lowered through remote control by the operator standing at the car 25 ft. from the screen. It is said that the screen will show a distinct pattern of light even in a well-lighted room at a distance of 25 ft., and adjustable indicators are provided for aim, focus and alignment.



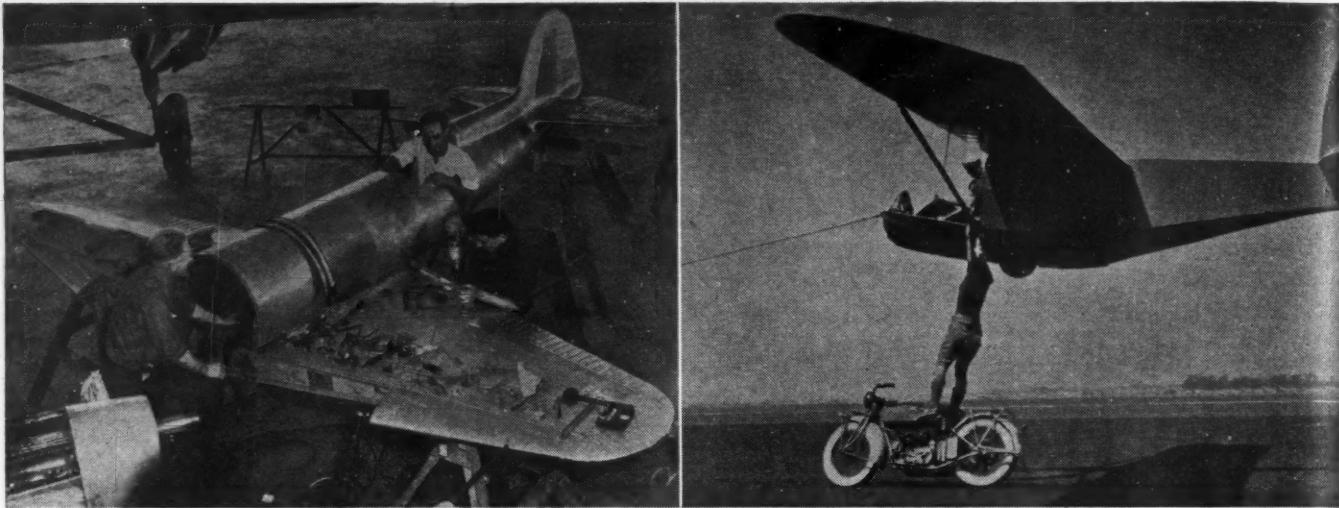
● Tell your jobber you want a set of these Weed Chain posters and counter card. Beautifully lithographed in colors, they catch the customer's eye and plant Weed Chains and their need in his mind. They make him (or her) realize it's time to prepare the car for winter driving with a set of tire chains that fit. For new chains they recommend Weed American Bar-Reinforced. For old chains they remind customers that you repair. Repairing old chains with genuine Weed Cross Chains is a service that pays in profit and good will. Get this complete sales help assortment and let it work for you along with the big national advertising campaign on Weed Americans. These sales helps start the sale—you complete it by asking your customer to buy.



AMERICAN CHAIN COMPANY, Inc.
BRIDGEPORT, CONNECTICUT

In Business for Your Safety

Licensed to manufacture and sell Bar-Reinforced Tire Chains under United States and Canadian Letters Patent: American Chain Company, Inc.; The McKay Company; The Hodell Chain Company; Pyrene Manufacturing Company; Dominion Chain Company, Limited; and Pyrene Manufacturing Company of Canada, Limited.



SIDE LIGHTS from the National Air Races held recently at Los Angeles. (Left) Harry Crosby in the cockpit of his tiny racing plane, while it was being built for the Air Races. (Right) Frank Wolcott (on motorcycle) transfers to a glider being towed by an automobile—one of the stunts performed on the final day of the races.

Willys-Overland Busy Retooling 1937 Models Expected by Nov. 5

Willys-Overland has been busy retooling with about 500 employees getting ready for production operations scheduled to begin about Oct. 1. Finished cars of the new 1937 model are expected to come off production lines by Nov. 5.

Subscription rights for the new Willys-Overland Motors, Inc., stocks have been sent to shareholders of the old company dated Aug. 27 and expiring on Oct. 2. Holders of the old stock have the rights to subscribe to units of one share of \$10 par preferred and one share of \$1 par common of the new company at \$10 a unit. Preferred stockholders may subscribe for one unit for each share of old stock while common stockholders may purchase one unit for each 17 shares of old common.

Checks for part payment of the stock along with subscriptions are received by the City Bank Farmers' Trust Co., New York, under terms of the agreement, approved by federal court.

Rose Wins at Syracuse Takes Second in National Race

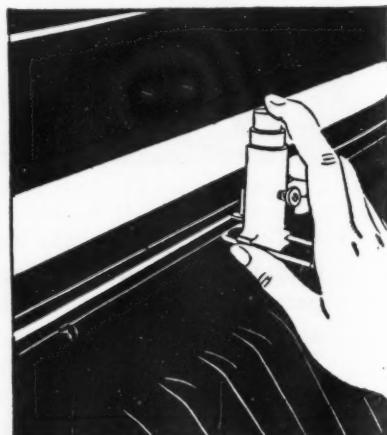
Mauri Rose, the Indianapolis Speedway headliner who came within 27 seconds of winning the "500" in 1934, grabbed the laurels in the 100-Mile National Championship classic at Syracuse, N. Y., Sept. 15. In second place was George Connor; third, Rex Mays; fourth, Jimmy Snyder; fifth, Frank Brisko and sixth, Bob Sall.

On the first turn, three cars crashed

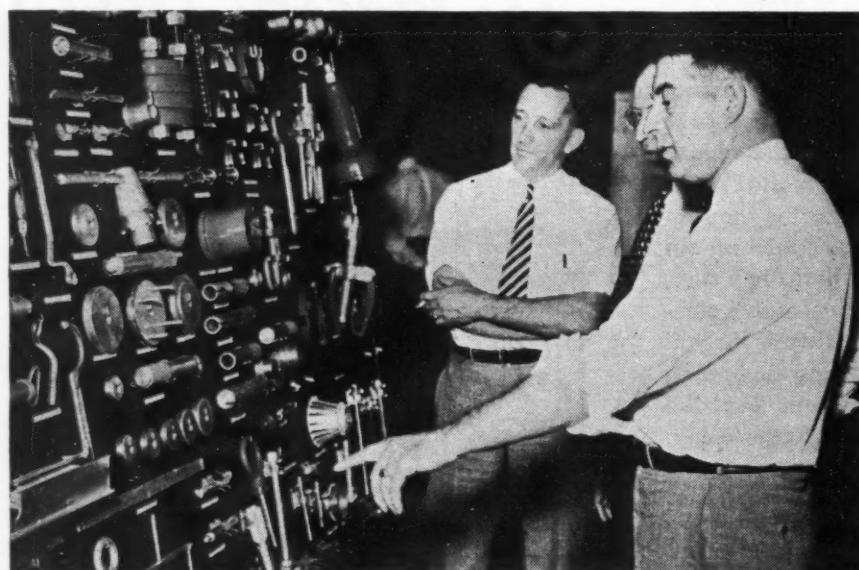
against the wall. Drivers involved were unhurt, but were unable to enter the re-start which was necessary as the result of the accident. These three men were Wilbur Shaw, Bill Cummings and Chet Gardner.

By reason of his Syracuse victory and the 120 Championship points credited there, Rose climbed into second place in the National Championship roster.

Paint Striping Set Announced by Lewis



Lewis Manufacturing Co., Decatur, Ill., manufacturer of paint striping equipment, is featuring their Standard Set No. 100 for automobile body, fender and hood striping. Set consists of guide, two guide wires and three barrels. Striping wheels are 1/32 in., 1/16 in., and 3/32 in. It is claimed that the equipment will use either synthetic or oil base enamel, and do the job quickly and easily. Price \$4.98.



C. W. WOOD, National Director of Service for Chevrolet, explains the new Chevrolet tools during a recent two-day conference of service managers from the company's dealerships all over the nation.

Ford Puts World Series on Air

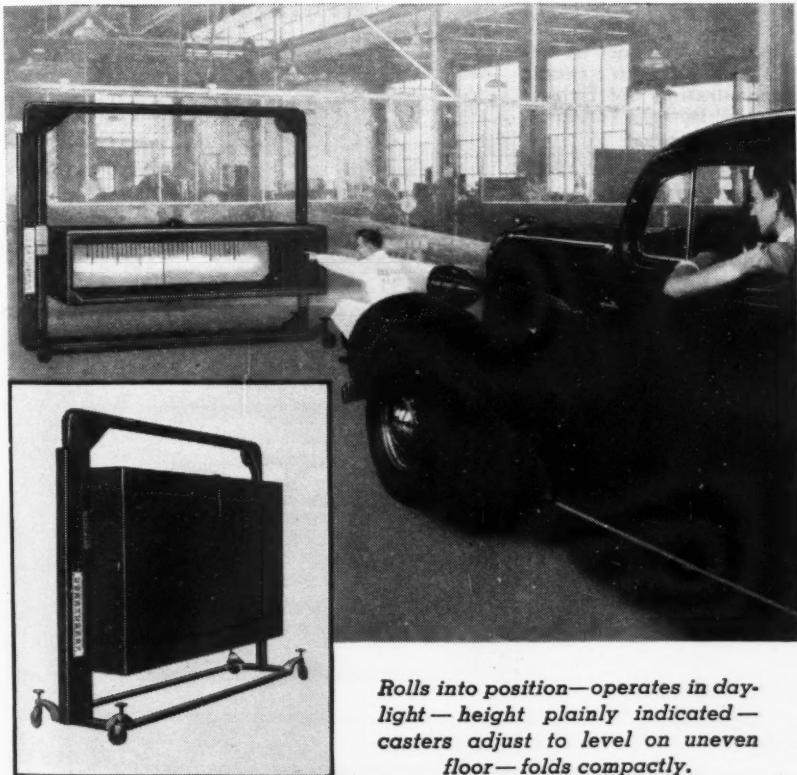
For the third successive year, all games of the 1936 World Series were broadcast under sponsorship of the Ford Motor Company.

BENDIX

ANNOUNCES A NEW AND IMPROVED

Headlight Tester

TO CREATE NEW BUSINESS FOR YOU!



Rolls into position—operates in daylight—height plainly indicated—casters adjust to level on uneven floor—folds compactly.

at a
lower price
\$165⁰⁰
t. o. b. South Bend

BENDIX-FERAGEN
HEADLIGHT TESTER

MOTOR AGE, October, 1936

WITH this new Bendix-Feragen Headlight Tester, you can do a thorough job of headlight testing and correcting quickly, easily and accurately. It will bring in extra sales of service and supplies that will speedily repay your moderate investment.

It's portable—rolls easily on its casters though it is very substantially constructed—weighs 350 pounds.

It's counter-balanced—stays in position, yet adjusts at a finger's push.

It folds down compactly—requires minimum space. Simply roll it away into a corner when not in use.

Use it in broad daylight—it indicates the approximate carrying distance of a car's lights under night driving conditions.

The customer actually sees what condition his lights are in. As a result re-silvering of reflectors, replacing weak or burned-out bulbs, replacing lenses, checking up and renewing wiring and terminals, correcting aim and focus of beam—all are sales readily made—new profit sources.

Sold on Very Easy Terms:

With all the safe-driving agitation existing today, car owners are becoming more and more aware of the importance of good lights—the bad manners and the menace of poor lights. With this simple, low-cost, scientifically proper equipment, you can draw and hold a big volume of this business. SEND THE COUPON TODAY FOR MORE INFORMATION!

BENDIX PRODUCTS CORPORATION
401 Bendix Drive, Dept. 11, South Bend, Ind.
(Subsidiary of Bendix Aviation Corporation)

Send full information about the new Bendix-Feragen Headlight Tester.

Name.....

Address.....

City..... State.....

Nature of Business.....



E. R. Thomas Dies

Edwin Ross Thomas, one of the pioneers of the American automobile industry, died in the Buffalo General Hospital, Buffalo, N. Y., September 13, aged 85 years. He was the founder of the E. R. Thomas Motor Co., which started the manufacture of automobiles in Buffalo in 1902. Its product, the Thomas Flyer, was one of the leading cars on the American market for a number of years, and many of them also were shipped abroad. The company engaged its cars in many races and other competitions, its outstanding achievement in this field being the winning of the New York-Paris race in 1908.

Jenkins at Bonneville

(Continued from page 42)

records were made in the following brackets: World's Unlimited, 12 records; International Class "A" 14; American Unlimited, 13; American Class "A," 13.

Eyston, Jenkins and Cobb also were the only speed record aspirants at Bonneville in 1935 and now that the season is about at its close, they again carry the only record assignment there this year.

Relief driver for Jenkins was "Babe" Stapp, Indianapolis speedway star and a headliner at the inaugural 400-Mile International Sweepstakes on the new Roosevelt Raceway, October 12. Cobb used three relief drivers.

World's Unlimited and International Class "A"

Distance	Miles per Hour	Former Speed	Former Holder	Date
100 Miles	169.57	.....	.....	9/28/36
200 Kilos	170.29	.....	.....	9/28/36
200 Miles	171.30	.....	.....	9/28/36
500 Kilos	167.11	.....	.....	9/28/36
500 Miles	168.44	.....	.....	9/28/36
1,000 Kilos	166.65	.....	.....	9/28/36
1,000 Miles	165.73	.....	.....	9/28/36
1 Hour	171.00	.....	.....	9/28/36
3 Hours	168.46	.....	.....	9/28/36
6 Hours	165.72	.....	.....	9/28/36
4,000 Kilos	152.60	151.48	John Cobb	9/11-12/36
3,000 Miles	153.60	150.40	John Cobb	9/11-12/36
5,000 Kilos	153.96	150.21	John Cobb	9/11-12/36
4,000 Miles	150.53	144.81	Capt. Geo. Eyston	7/12-14/36
5,000 Miles	149.42	142.61	Capt. Geo. Eyston	7/12-14/36
10,000 Kilos	148.97	137.45	Capt. Geo. Eyston	7/12-14/36
24 Hours	153.77	150.16	John Cobb	9/11-12/36
48 Hours	148.63	136.34	Capt. Geo. Eyston	7/12-14/36

South Bend Lathe Provided With Pedestal Motor Drive

The South Bend Lathe Works, South Bend, Ind., has announced that their new 1936 Model 9-in. Workshop Lathe is now supplied with the pedestal type of motor drive. The motor drive mechanism is mounted on a

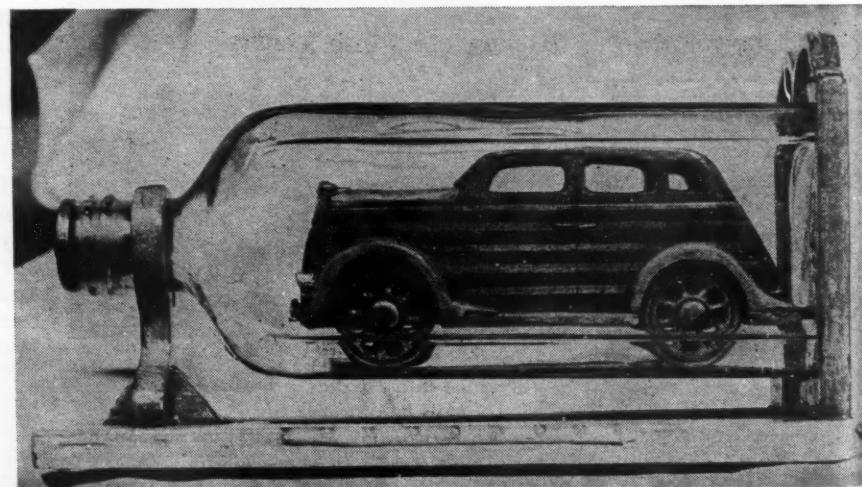


"STAR salesman", Mrs. Thelma Patterson, daughter of E. G. Austin, Exide Wholesaler, Battle Creek, Mich., covers part of her dad's territory. Cameraman caught her while demonstrating the Exide "Automatic" Battery Vendor.

Specifications for 1937 Cars

For complete specifications on 1937 models of Packard, Studebaker and Graham—refer to tables appearing on pages 62 and 63.

metal pedestal back of the lathe, with a V-belt connected to the drive pulley. The manufacturer claims that this method of drive eliminates lathe vibration and shadows cast on the work by overhead belts. Several improvements are claimed for the 1936 model lathe.



FROM bits of old furniture and cigar boxes, John W. Gheen, of Philadelphia, has made this miniature of a modern motor car and assembled it piece by piece inside a bottle.

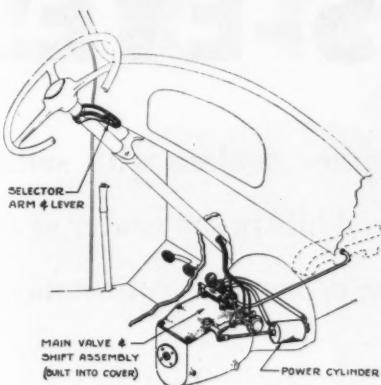
N. J. Repairmen Meet

Over 300 members of the trade attended a recent meeting of the independent automotive repairmen of New Jersey, held in Newark under the auspices of The Co-operator, the trade's official publication.

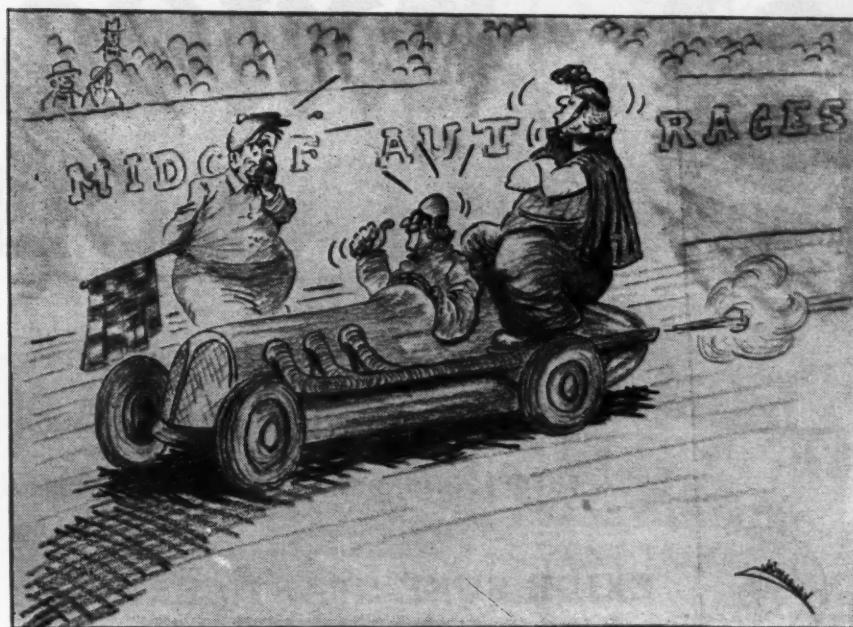
The meeting was conducted by J. Alden De Ronde, editor of *The Co-operator* and business manager of the state repairmen's association, and was addressed by Deputy Inspector Wm. J. Dearden of the New Jersey Motor Vehicle Department, who presented all information at present available regarding New Jersey's new Compulsory Inspection Law.

Evans Perfects Vacuum Operated Gear Shift

Evans Products Co., Detroit, Mich., has announced the production of a newly perfected vacuum-operated gear shift, which is said to be readily adaptable for all types of automotive



vehicles and to be simplified in construction and in operation. It is operated by a vacuum-suspended cylinder, the main control being from the selector lever attached to the steering column. Small tubes carried within the steering column connect direct to the main valves, which in turn operate the power cylinder. It is claimed that noise from gear clashing is entirely eliminated. The shift may be made either in the conventional manner by depressing the clutch first and moving the selector lever, or by setting the selector lever to the gear desired and then depressing the clutch. All control mechanism is built as a unit in the transmission cover, and the number of working parts has been reduced to a minimum.



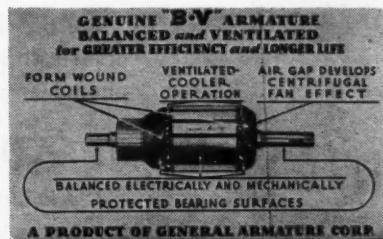
"Tha's me ol' lady—she's always back-seat drivin'!"

New AMCO Catalog

The Asbestos Mfg. Co., Huntington, Ind., manufacturers of AMCO brake lining and clutch facings, has just announced a new parts catalog. It lists the model of each car and the brake lining Set No. used, and carries a cross index showing the brake Set No. and the car model applications. It also contains a complete price list indexed by brake Set No.

New "B-V" Armature

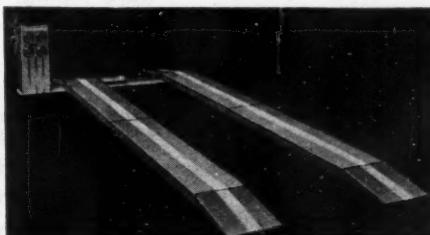
The General Armature Corp., Chicago, Ill., has announced a new arma-



DR. C. G. ABBOTT, scientist, secretary of the Smithsonian Institute, demonstrates his solar heater which draws power from the sun's rays. The machine on the left operates a $\frac{1}{2}$ h.p. engine, shown below.

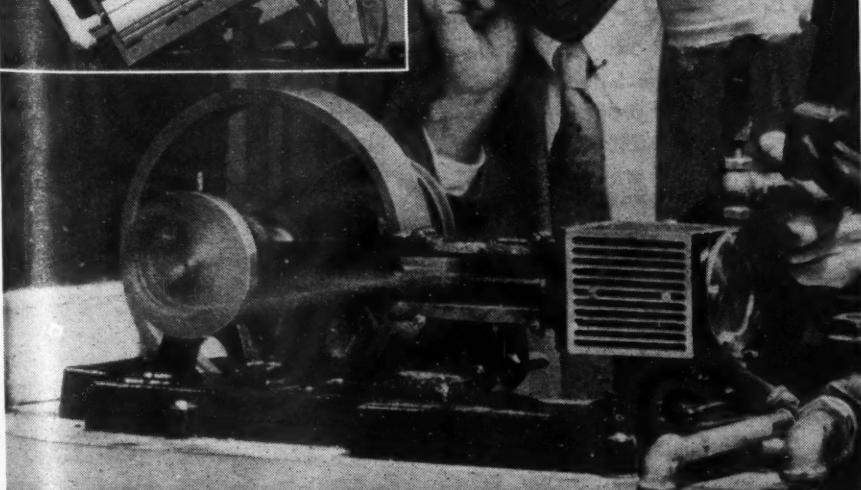
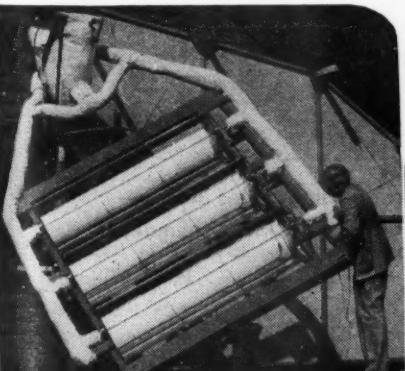
ture which is said to be constructed by a special patented form winding process to insure a high degree of electrical and mechanical balance. The special construction produces a centrifugal fan effect as the armature rotates, forcing a draft of air through its coils.

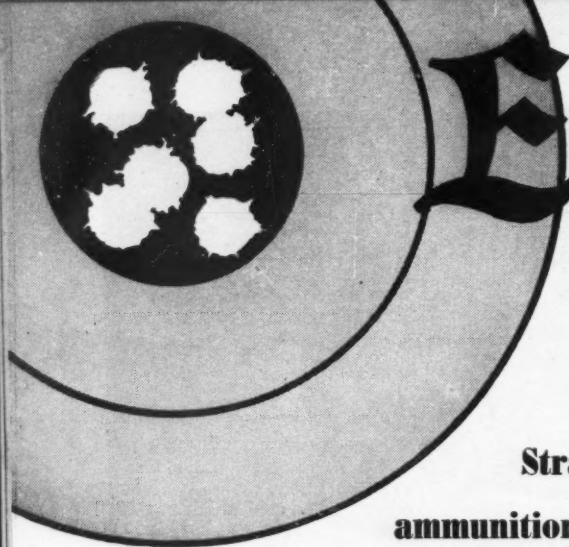
Bear Drive-on Brake Tester



Bear Mfg. Co., Rock Island, Ill., has announced a new brake tester of the drive-on type, operating on the hydraulic principle. It is said to be extremely sensitive, and quickly indicates brake drag, loose brakes, glazed linings and all other brake troubles. Four dials, one for each wheel, record the condition of each brake.

WHENE'ER a driver asked for gas
A gadget they'd unfold.
And many times this little trick
For them, the gadget sold.





Exide SCORES SIX BULL'S-EYES FOR PROFIT

Straight to the mark . . . Exide supplies dealers with selling ammunition that has scored six high-powered hits in the center of the target . . . one right after the other. Each one a proved profit-maker!



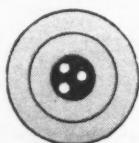
EXIDE SURE-START SERVICE

The most revolutionary battery-merchandising program ever turned over to the automotive dealer—taking the guesswork out of battery sales and profits—promoting the sale of recharges, oil, cables, spark plugs, etc., in addition to new Exide Batteries. A proved profit-maker.



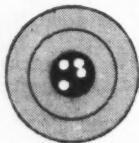
THE EXIDE AUTOMATIC VENDOR

For the first time, a complete, self-contained battery selling unit. It attracts customers—it displays—it sells—automatically. Out only a month, it has already proved a phenomenal success in the hands of dealers everywhere. A second proved profit-maker.

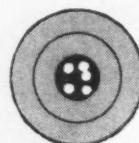


EXIDE ADVERTISING

The Exide advertising to car-owners, in national magazines and the leading farm publications, month after month implants in your customers' minds the facts on Exide Batteries and Exide Sure-Start Service, creating the desire to own a dependable Exide Battery. A third proved profit-maker.

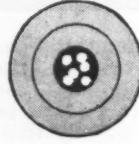


An interesting advertisement on the Exide Hycap Battery appears in The Saturday Evening Post, November 7th and Collier's, November 14th.



EXIDE COOPERATION WITH THE TRADE

Exide supplies dealers with a steady barrage of merchandising sales helps—hard hitting, sure-fire material that puts a dealer in the battery business to make money. A fourth proved profit-maker.



THE EXIDE PRICE-STRUCTURE

Exide's long marketing experience and tremendous manufacturing facilities enable Exide to build batteries of the highest quality, that you can sell to car-owners at reasonable prices, with a substantial profit to yourself. Exide Batteries are priced for every car-owner, and are guaranteed under the Standard NBMA Plan, fair to the trade and to customers alike. A fifth proved profit-maker.

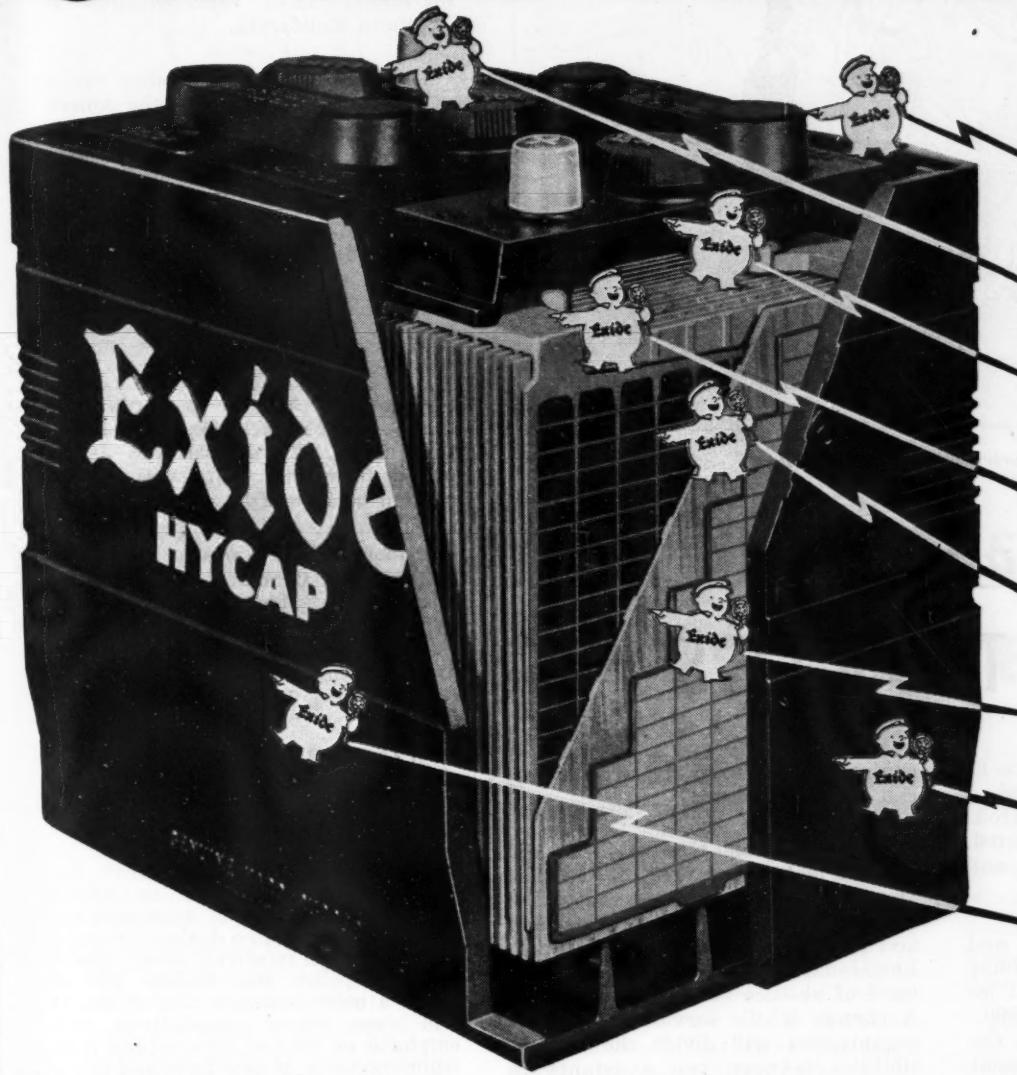
EXIDE BATTERIES

Today the new Exide Batteries offer more power, longer life and greater dependability, for less money, than has ever before been available in automobile history.

Embodying every worthwhile improvement found in 48 years of battery building experience, Exide Batteries are of **BALANCED CONSTRUCTION**—no one feature overshadows the battery as a whole, but all construction details are designed to produce high starting performance and long life.

TO ILLUSTRATE BALANCED CONSTRUCTION . . .

SIX STRAIGHT S FOR THE DEALER!



**EXTRA HEAVY
CELL CONNECTORS**

**SPRAY PROOF
VENT PLUGS**

**REINFORCED HARD
RUBBER COVERS**

**HIGH CONDUCTIVITY
STRAPS AND POSTS**

OVERSIZE PLATES

**LONG LIFE
SEPARATORS**

**EXTRA DURABLE
HARD RUBBER
CONTAINER**

**APPEARANCE
AND FINISH**

EXTRA HEAVY CELL CONNECTORS—Providing extra current carrying capacity with low voltage loss. Permit rapid testing.

SPRAY PROOF VENT PLUGS—Screw type octagonal design. Easy grip for testing and servicing. Special baffle design prevents electrolyte spray from reaching top surface of battery.

REINFORCED HARD RUBBER COVERS—Special deep single flange type, sealed to container with Exide compound. Seal between cover and post is of lead insert welded type for maximum strength and positive elimination of leakage to top of battery.

HIGH CONDUCTIVITY STRAPS AND POSTS—Heavy posts and plate straps of antimonial lead alloy, providing free flow for the heaviest current—rigid, durable construction.

OVERSIZE PLATES—Almost $\frac{1}{8}$ " higher and with 14.5% thicker positives than standard. 47.4% more plate surface and 54.4% more battery plate material than usual. Extra high capacity for Touch and Go Starts in all weather. **GRIDS**—Of special interlocking long life design and low internal resistance. Corners of grid frames beveled, with plate feet of opposite polarity resting on separate bridges—to prevent separator pinching and consequent short circuiting. **ACTIVE PLATE MATERIAL**—Result of years of Exide's laboratory and

field tests. Produces greater power and adheres to the grid structure longer.

LONG LIFE SEPARATORS—Individually tested and inspected. In some Hycaps Grade #1 sliced Port Orford cedar separators are used. The best grades have Mipor, the exclusive Exide latex base separator with exceptionally high conductivity, impervious to heat and resistant to vibration wear—the separator used in Exide Batteries for vital Government services as well as railroad and other heavy industries.

EXTRA DURABLE HARD RUBBER CONTAINER—Specially designed to withstand shock, temperature changes, wear, vibration, and rough usage. Tapered built-in projections wedge elements firmly in place. **ELECTROLYTE SPACE**—Extra space on edges as well as on top of plates and separators permits free circulation of electrolyte. **SEDIMENT SPACE**—Ample space provided to prevent sediment interfering with normal operation, even after unusually long, hard wear.

APPEARANCE AND FINISH—Hycaps are finished with black lacquer, weather and acid resisting, specially developed for Exide. Embossed lettering is in acid proof orange for eye-catching contrast. On the end panels appear the 20 hour and 300 ampere ratings made in accordance with S.A.E. tests. Modern styling in all types.

See your Exide wholesaler today, or get in touch with us.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto



"Does that price include everything?"

Repairman's Visit To The FACTORIES

1937 automobiles are expected to be priced close to those of 1936 according to latest dispatches from Detroit. Few price changes are anticipated, notwithstanding higher material and labor costs.

* * *

Harlow H. Curtice, president and general manager of the Buick Motor Co. made known last month that an additional appropriation of \$14,500,000 is being spent to carry out the production and factory improvement inaugurated two years ago.

* * *

The B. F. Goodrich Rubber Co., Akron, announced cancellation of its private brand Atlas tire contract with Atlas Supply Co., subsidiary of Standard Oil, last month. In doing so, Goodrich became the second major tire company to terminate a cost-plus private-brand tire contract since enactment of the Robinson-Patman price discrimination law. Recently, Goodyear Tire & Rubber Co. announced termination of its contract with Sears, Roebuck & Co.

* * *

Karl Imfeld, general manager of S. A. Adolphe Saurer, Arbon, Switzerland, headed a party of his associates on a tour of various automotive centers. They drove a passenger car in which is mounted a Saurer Diesel

engine for demonstration with American manufacturers.

* * *

C. P. Simpson, vice-president and general sales manager of Pontiac Motor Co., has announced that J. H. Otis has been appointed parts and accessories manager succeeding O. A. Lamoreux, who has been granted a leave of absence because of ill health. A change in the service department organization will divide the responsibilities between two assistants to Marshall, one serving the east and the other the west, following the divisional arrangement which prevails in the sales department. Assistant service manager in charge of the east will be Walter Martin, while the western assistant will be O. M. Dahl.

* * *

A quarter million dollar expansion program of the plant and equipment of the Federal Bearings Co., Inc. of Poughkeepsie, New York, has been announced by Herman A. Schatz, President and Treasurer of the company. The plans include an addition, 160 ft. x 60 ft., three stories high, to the present Federal buildings, making the sixth major structure erected since the formation of the corporation in the year 1910.

* * *

Ralph Fisher, formerly of the

Houdaille-Hershey Corp., has been appointed Sales Manager of the Stamping (Eaton Detroit Metal Co.) and Bumper Divisions of Eaton Mfg. Co., with headquarters in Detroit.

* * *

Ex-Cell-O Aircraft & Tool Corp. of Detroit, announced the appointment of the Herberts Machinery Co. Ltd., Los Angeles, Calif., as their exclusive machinery sales representative in Southern California.

* * *

Export sales on Remco shop equipment are to be handled by the American Steel Export Co., New York, according to a report from R. E. Manley, president of the Manley Products Corp.

* * *

Allbestos Corp. has appointed W. L. Day as sales manager to succeed Maurice R. Krader. Mr. Day was formerly the Allbestos Philadelphia district manager.

* * *

A. Joseph Magyar will represent the Rogers Products Co., Inc., Jersey City, N. J., in northern New Jersey and in New York State, with the exception of New York City.

* * *

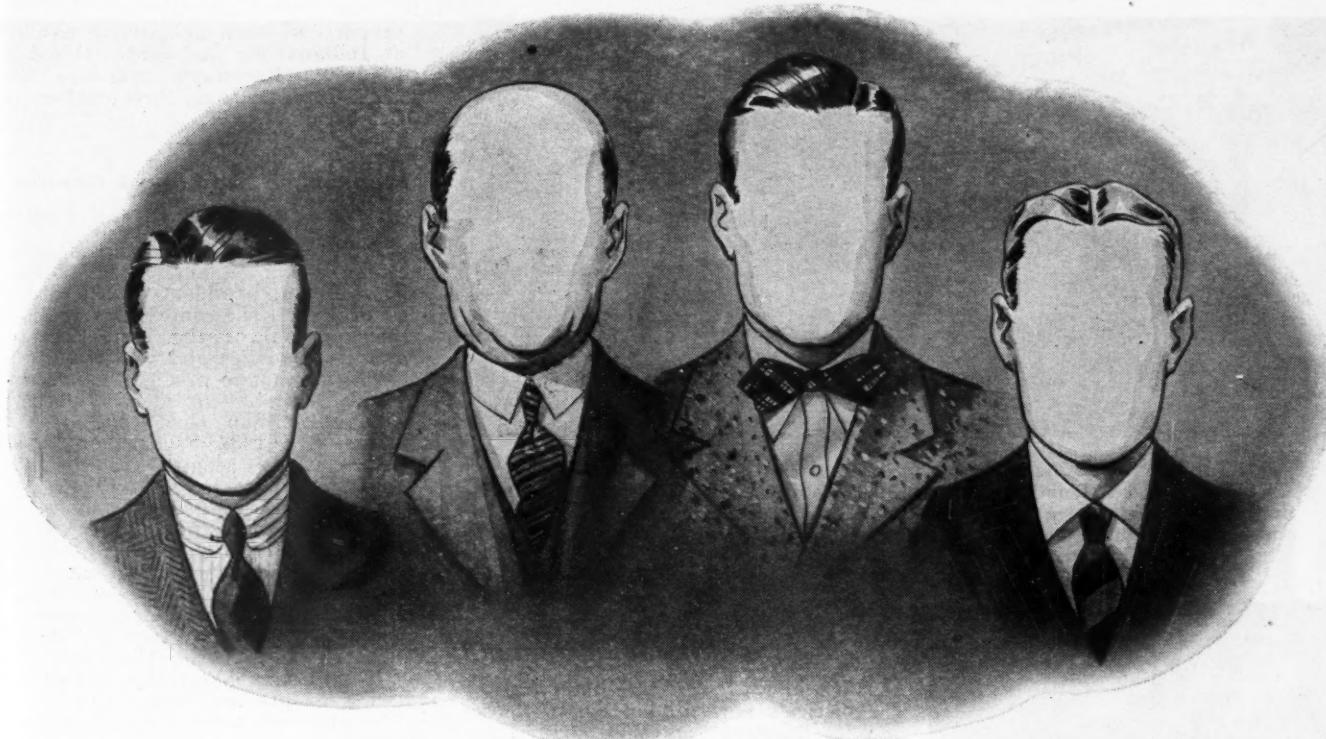
Announcement was made last month by C. O. Wanvig, president of Globe-Union Mfg. Co., Milwaukee, Wis., that at its last stockholders meeting, the corporate name "Globe-Union Mfg. Co." was changed to "Globe-Union, Inc."

Reo Quits Passenger Cars; More Complete Truck Line

Withdrawal of Reo Motor Car Co. from the passenger car field will involve no change in the company's distributing arrangements, an official stated. The amount of passenger car business done by Reo dealers in recent years has been relatively small. Under the new policy Reo dealers will be given a more complete line of trucks and buses, priced competitively with emphasis on the low price volume field. Announcement of new lines and prices is expected to be made about the time of the New York automobile show. Reo also has been exploring the trailer field but as yet no decision has been made to enter this market. Additional coverage in the commercial field is expected to more than make up for dealers' loss of volume resulting from dropping the passenger car.

Auburn Moves to Connersville

Having moved all the department activities of Cord and Auburn automobiles to the plant at Connersville, Ind., where they can be concentrated with factory activities, Auburn is turning its attention to plans for next year. The work of concentrating all activities at the Connersville plant was begun last May with removal from Auburn of the engineering department. The last to move were the executive and administrative offices, with the accounting, sales, export and advertising departments.



HOW TO SELL CARS to men you've never seen!

There's a sure-fire, common-sense way to make good prospects out of men you've never seen.

It works like this:

You've sold a man a car. It's pleased him from the first flip of the switch. It's been running like a Swiss watch since the first time the starter buzzed. He's happy as a meadow full of larks with it.

You know what happens *then!* He bubbles over to everyone he knows—boosting his car. Shunting half-sold prospects that you never heard of right into your hands.

To turn *every* new owner into an enthusiastic salesman for you, take

extra pains to see that his new car gets off on the right foot. To many dealers, that means taking these two steps:

First: fill the crankcase with Gulfpride—beyond a shadow of a doubt the finest motor oil the world has ever known! It's 100% Pure Pennsylvania. It's stripped bare as a flagpole of gum and sludge-forming compounds. Gulfpride has run automobile engines 80,000 miles without a trace of carbon—and it will do more to keep a motor mechanically perfect than any other oil made!

Second: put Gulf No-Nox Ethyl,

Aviation Grade Gasoline in the tank. Get your new owner off to a flying start with a gas that helps a car to surge up hills—to slam a driver back against the cushions when he "steps on it." A gas that makes him *know* he's got a two-fisted brute of a power plant under that hood!

Fill out the coupon below and get the complete Gulf story. Send for a FREE copy of a brand new book, "You Can't Call It Luck!" It tells why doing business with Gulf is most profitable to you. Mail the coupon today!



**GULF PETROLEUM
PRODUCTS**



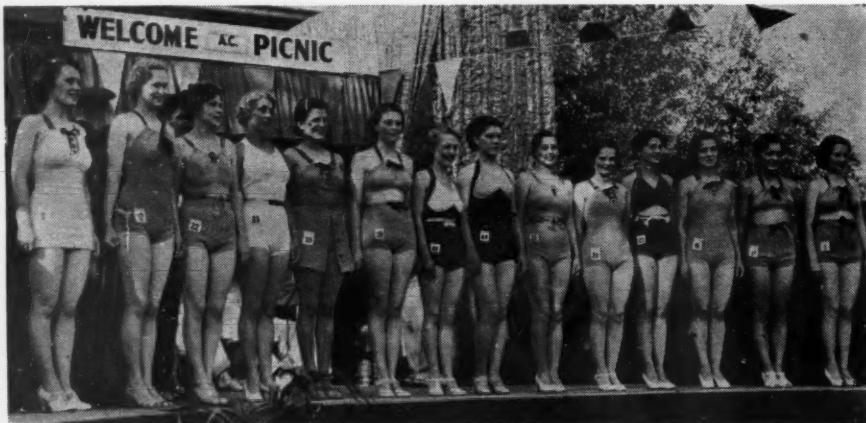
GULF,
3800 Gulf Building,
Pittsburgh, Pa.

Please send me a FREE copy of your new book for dealers, "You Can't Call it Luck!"

Name _____

Street _____

City _____ State _____



A BEVY of 50 bathing beauties paraded for AC Spark Plug Company employees and their families at the annual AC outing. From the 50, these 14 finalists were selected, with Miss Mozelle Cravens, advertising employee, being chosen queen. Miss Cravens is on the extreme right. More than 15,000 persons attended the outing.



MISS QUINCE SMITH, shown on her arrival from Palestine, with her automobile which has a wire screen around the windows to protect occupants from injury from stones thrown during the recent disturbances in Palestine.

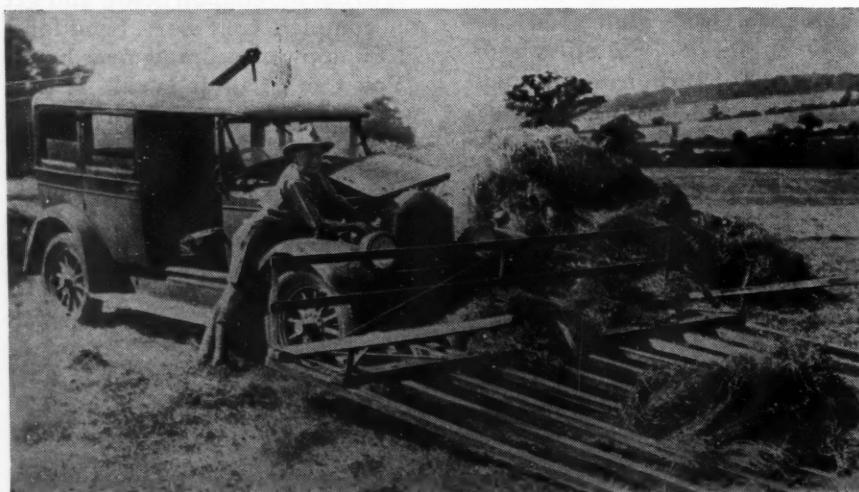
New Road Racing Course in England

On the eve of the inaugural of America's new million dollar Roosevelt Raceway at Westbury, Long Island—believed by racing experts to be the beginning of a circuit of specially constructed road racing courses throughout the nation—England is agog over the prospects of a new road racing course on the grounds of Crystal Palace in southeast London.

From reliable sources in England comes word that a two-mile circuit there likely will open next April and that a group to be known as the International Road Racing Club is being formed to assure the new racing course.

Two miles in length with a hard surface, the winding contour of the proposed circuit is similar, in a degree, to the new Roosevelt Raceway, except that the London circuit will be carried over several grades and does not contain curves of the sharp radius evident at Roosevelt Raceway.

Accommodations are planned for crowds of the "hundred thousand"



DERRICK SAGAR, 14-year-old British schoolboy earned \$5 a week in pocket money during his vacation, with the aid of an old automobile, which he converted into a hay-gathering machine. With his contraption it is said that he was able to do the work of two pairs of horses and three men in half the time and at about half the cost.

proportions such as already handled at Indianapolis and contemplated at Roosevelt Raceway's premiere 400-Mile International Sweepstakes on October 12.

Studebaker Announces Contest Based on Presidential Voting

A "Presidential Sweepstakes" prize contest has been announced by Paul G. Hoffman, president of the Studebaker Corp. The contest has received the approval of the United States postal authorities and participants in it will attempt to predict the outcome of the November presidential election.

Mr. Hoffman has posted five prizes—five 1937 Studebaker President cruising sedans—for the five persons who most closely predict the result of the voting in November. In case of ties duplicate prizes will be awarded. The rules of the contest are simple. Persons desiring to enter are asked to go to their nearest Studebaker distributor or dealer showroom. There they will be given a "ballot" or entry postal card. They will also be given a pamphlet which carries the results of previous presidential elections and will prove helpful in their prognostications.

After the contestants have done their "doping" of the result of the President Roosevelt-Governor Landon battle, they will record their prediction on the voting card and mail it to South Bend. The contest will close on October 30. Mr. Hoffman is to be sole judge and will make his decision and award the prizes as soon after the November voting as possible.

Porsche, German Designer, To See Roosevelt Raceway

Dr. Ferdinand Porsche, the German engineer responsible for the design of the Auto Union racing cars, is expected to attend Roosevelt Raceways, on Oct. 12, in order to become acquainted with American racing car design and construction.

This season has proved that the 16-cylinder rear engine Auto Union cars are the fastest and most efficient in Europe. While it is doubtful if they will be represented in the Roosevelt race, the firm is interested in American racing and has promised to come over in force next season.

N.S.P.A. Elects New Members

At the meeting of the N. S. P. A. Executive Committee in Chicago, Ill., September 10, fifteen wholesalers and twelve manufacturers were elected to membership in the association.

New members in the manufacturers group are: Appleton Electric Co., Chicago, Ill.; Bearings Co. of America, Lancaster, Pa.; Joseph Dixon Crucible Co., Jersey City, N. J.; Forsberg Mfg. Co., Bridgeport, Conn.; The Gray Co., Inc., Minneapolis, Minn.; Motor Master Products Corp., Chicago, Ill.; Nice Ball Bearing Co., Philadelphia, Pa.; RCA Mfg. Co., Inc. (Auto Radio Div.), Camden, N. J.; Star Tool Co., Minneapolis, Minn.; Tuthill Spring Co., Chicago, Ill.; Weaver Mfg. Co., Springfield, Ill.; Guelph Spring & Axle Co., Ltd., Guelph, Ont., Can.

NOW A NEW 7-INCH

BLACK & DECKER SANDER

for only

\$39.50

—and a new low price on
the 7" Heavy Duty Sander

Here's a real, quality-built sander at the lowest sander price in Black & Decker history—the new No. 17 Junior at \$39.50—with literally hundreds of time and labor saving uses in auto body work, painting, touching-up, welding and metal finishing. For large shops requiring a sander for continuous use, the price of the Black & Decker 7-Inch Heavy Duty Electric Sander (No. 35) has been reduced from \$75.00 to only \$68.00.

Ask your Black & Decker Jobber for a demonstration—or write for full details. The Black & Decker Mfg. Co., 727 Pennsylvania Avenue, Towson, Md.

BLACK & DECKER
World's Largest Manufacturer of
PORTABLE ELECTRIC TOOLS

Purchasers of the new 1937 cars will be prospects for this sensational jack. . . . Motorist can stand up and position it quickly—no need to crawl under car.

HEIN-WERNER *Bumper-Lift* HYDRAULIC JACK

\$4⁹⁵ NET TO
DEALER



A Complete Line
•
Built Right...
• Priced Right
•

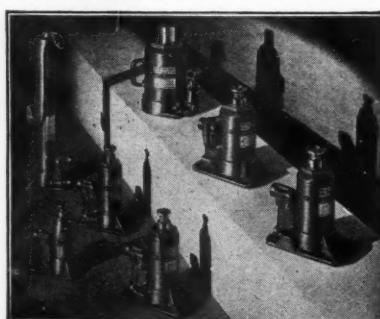
THE ever-increasing demand for the Bumper-Lift Hydraulic Jack, designed and pioneered by Hein-Werner, proves that people who purchase new cars want and need this type jack.

New design incorporates universal hook that can quickly and easily be positioned to any one of 18 different lows. Hooks under bumper arm of modern cars. No need for motorist to get on knees or crawl under car to position or operate this jack.

Dealer price \$4.95 (West Coast \$5.65).

New 2-Ton Light Truck Special \$4.15

Model 2.95A (not illustrated) is of the conventional Hein-Werner Hydraulic Truck Jack advanced design specially developed for Ford, Chevrolet and other light trucks. This jack is tested at 1½ times rated capacity of 2 tons. Has 7" lift to total height of 16½". Dealer price \$4.15 (West Coast \$4.55).



Other hydraulic jacks in this complete line include the "Bullet" Model 1½ ton capacity for light passenger cars at \$2.80 (West Coast \$3.10) . . . FOR TRUCKS—3 ton capacity models at \$7.95 (West Coast \$8.45) . . . 5 ton models at \$9.95 (West Coast \$10.65) . . . 7 ton models at \$13.45 (West Coast \$14.50) . . . 12 ton models at \$19.95 (West Coast \$21.00) . . . 20 ton models at \$30.00 (West Coast \$31.00)—and a new FLOOR JACK, the "Zephyr" 3 ton capacity \$49.50 (West Coast \$55.00) . . . All prices are net to dealer.

HEIN-WERNER MOTOR PARTS CORP.
WAUKESHA, WISCONSIN

FEW MODELS ENGINEERED TO DO THE WORK OF MANY
HEIN-WERNER
hydraulic JACKS

Old Pays For New

(Continued from page 32)

three months' time.

Now, it happens that the Germershausen shop does a good business among fleet operators and truckers in the area of Plainsfield, Westfield, Somerville and Bound Brook, N. J., through its welding and spring service. But—the wheel alignment equipment handled only passenger cars.

The success of the smaller unit prompted Mrs. Germershausen to install a larger piece of wheel alignment equipment, handling both passenger cars and trucks—thereby extending the shop's services to a larger number of customers among truck and fleet owners.

The one-year-old piece of shop equipment bought and paid for the newer unit, which was installed last month.

When the new equipment was set up, a demonstration was held at the Germershausen shop, to which fleet operators, truck owners, car dealers and other independent shop owners from the surrounding territory were invited by a special direct mail advertising campaign. The success of the meeting was sufficient for Mrs. Germershausen to expect another bread-and-butter volume maker in that heavy duty wheel alignment equipment.

Kettering Made Chairman of Patent Celebration

A nation-wide celebration of the founding, in 1836, of the present American Patent System will be held here on November 23, 1936.

Dr. Charles F. Kettering, President of the General Motors Research Corporation, made this announcement here in accepting an invitation of Secretary of Commerce, Hon. Daniel C. Roper, to serve as chairman of the National Committee.

The celebration will have the sponsorship of the National Committee, whose membership includes representatives of the Department of Commerce, the U. S. Patent Office, the national association of patent attorneys, science museums and the industries of the nation.

The American Patent System Centennial will review the past, present and future progress of industry and science through the inventive arts.

Safety Meeting Held

Preceding a conference on Safety proclaimed by Governor Hoffman of New Jersey which is to be held at Atlantic City, N. J., Oct. 5 to 9, preliminary meetings were held throughout the state which were attended by the mayors and other officials of local communities.

At Camden, N. J., the highly successful meeting was sponsored by Elmer F. Woods, president of the Camden Storage Battery Co., and arranged by H. H. Hart, assistant branch manager of the United Motors Service and E. S. Temple, service engineer of the United Motors Service.

The principal speaker, H. L. Scott of the United Motors Service, spoke on the relation of head lighting to safety and pointed out the majority of accidents occurred after dark.

ETHYL customer.

There's Money in your ETHYL Business...

HERE'S PROOF

Early returns from a national survey to determine the cash value of buyers of Ethyl, "regular" and "third grade" gasoline reveal some jarring facts for every distributor and dealer in the industry. Let the results of the first thousand returns speak for themselves:

	<i>Ethyl Users</i>	<i>"Regular" users</i>	<i>3d Grade users</i>
Average price paid for oil	30.4¢	26.7¢	21.3¢
Buy premium oil	74.7%	44.3%	10.9%
Buy "regular" oil	24.3%	48.9%	30.1%
Buy 3d grade oil	.5%	6.8%	57.6%
Average mileage between crankcase drains	1,382	1,451	2,331
Average mileage between grease jobs	1,190.7	1,505.5	2,149
Average gallons of gas purchased per stop	9.7	6.8	4.34
Percent of users who filled tanks when buying gasoline	75.2%	37.4%	16.4%
Percent of buyers who made purchases of other than gasoline	29.5%	10.0%	8.2%
Average amount of these additional purchases	\$2.47	\$2.15	\$.77

These figures are the result of taking buyers "as they come" in all types of stations, in all sections of the country. The survey is continuing.

Meanwhile, hold on to your Ethyl customers and increase them by "stepping up" your "regular" buyers. Very definitely, ETHYL BUSINESS is PROFITABLE BUSINESS!

NEXT TIME SELL ETHYL



Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the

Line Number	MAKE AND MODEL	Lowest Priced 4-door Sedan	Wheelbase (Ins.)	Tire Size (Ins.)	No. of Cylinders, Bore and Stroke	Taxable H.P.	ENGINE										CHASSIS								
							PISTON DISPLACEMENT (C.C. IN.)	MAXIMUM BRAKE H.P. AT SPECIFIED R.P.M.	COMPRESSION RATIO (O-E-1)	DISPLACEMENT FACTOR (1)	CYLINDER HEAD MATERIAL	CAMSHAFT DRIVE MAKE	PISTON MATERIAL	OIL CLEANER MAKE	CARBURATOR MAKE	MUFFLER MAKE	PISTON MATERIAL	AIR CLEANER MAKE	CAMSHAFT DRIVE MAKE	PISTON MATERIAL	PISTON MATERIAL	CLUTCH	GEARSET MAKE	UNIVERSAL TYPE AND MAKE	REAR AXLE TYPE AND MAKE	SERVICE BRAKE MAKE AND TYPE	STEERING GEAR MAKE
1	Auburn	654	8795	120	6.00/16	6-3½x4½	22.5	209.9	85-3500	6.20	37.4	Al.	Whit.	Al.	Pur.	AC.	Str.	Buf.	A.	USL.	P.Long.	WG.	Nb-Mec.	½ Col.	BH.
2	Auburn	852	1095	127	6.50/16	8-3½x4½	30.0	279.9	115-3600	6.50	41.4	Al.	Whit.	Al.	Pur.	AC.	Str.	Buf.	A.	USL.	P.Long.	Det.	Nb-Mec.	½ Col.	BH.
3	Auburn	SC852	1545	127	7.00/16	8-3½x4½	30.0	279.9	150-4000	6.50	...	Al.	Whit.	Al.	Pur.	AC.	Str.	Buf.	A.	USL.	P.Long.	Det.	Nb-Mec.	½ Col.	BH.
4	Austin	75	3.75/18	4-2.2x3	7.8	45.6	13-3200	5.30	...	Cl.	Spir.	Al.	No.	No.	Til.	Buf.	A.	USL.	P.Rock.	WG.	F.Spi.	½ Sal.	M.m.		
5	Buick	36-40	885	118	6.50/16	8-3½x4½	30.6	233.0	93-3200	5.65	39.6	Cl.	LB.	Ala.	No.	AC.	Str.	Wal.	D.	Del.	P.Own.	Own.	m-Spi.	½ Own.	OH.
6	Buick	36-60	1090	122	7.00/15	8-3½x4½	37.8	320.2	120-3200	5.45	...	Cl.	LB.	Ala.	AC.	AC.	Str.	Wal.	D.	Del.	P.Own.	Own.	m-Spi.	½ Own.	OH.
7	Buick	36-80	1255	131	7.00/16	8-3½x4½	37.8	320.2	120-3200	5.45	40.7	Cl.	LB.	Ala.	AC.	AC.	Str.	Wal.	D.	Del.	P.Own.	Own.	m-Spi.	½ Own.	OH.
8	Buick	36-90	1695	138	7.50/16	8-3½x4½	37.8	320.2	120-3200	5.45	...	Cl.	LB.	Ala.	AC.	AC.	Str.	Wal.	D.	Del.	P.Own.	Own.	m-Spi.	½ Own.	OH.
9	Cadillac	V8-60	1695	121	7.00/16	8-3½x4½	36.4	322.0	125-3400	6.25	45.7	Cl.	Mor.	Ala.	No.	AC.	Str.	Old.	D.	Del.	P.Long.	Own.	Nb-Mec.	½ Own.	BH.
10	Cadillac	V8-70 & 75	2445	131-38	7.50/16	8-3½x4½	39.2	346.0	135-3400	6.25	(a)	Cl.	Mor.	Ala.	No.	AC.	Str.	Old.	D.	Del.	P.Long.	Own.	Nb-Mec.	½ Own.	BH.
11	Cadillac	V12-80 & 85	3145	131-38	7.50/16	12-3½x4½	46.9	368.0	150-3600	6.00	(b)	Cl.	Mor.	Ala.	Han.	AC.	DL.	Old.	D.	Del.	P.Own.	Own.	Nb-Mec.	½ Own.	BH.
12	Cadillac	V16-90	7250	154	7.50/17	16-3½x4½	57.5	452.0	185-3800	6.00	43.7	Cl.	Mor.	Ala.	Cu.	AC.	DL.	Old.	D.	dp.Own.	Own.	Nb-Mec.	½ Own.	OP.	
13	Chevrolet	Maz. Con.	640	113	5.50/17	6-3½x4	26.3	206.8	79-3200	6.00	35.2	Cl.	Own.	Cl.	No.	AC.	Car.	Own.	D.	D.	P.Own.	Own.	m-Own.	½ Own.	OH.
14	Chevrolet	Maz. Ind.	640	113	5.50/17	6-3½x4	26.3	206.8	79-3200	6.00	34.6	Cl.	Own.	Cl.	No.	AC.	Car.	Own.	D.	D.	P.Own.	Own.	m-Own.	½ Own.	OH.
15	Chevrolet	Std.	575	109	5.25/17	6-3½x4	26.3	206.8	79-3200	6.00	39.5	Cl.	Own.	Cl.	No.	AC.	Car.	Own.	D.	D.	P.Own.	Own.	m-Own.	½ Own.	OH.
16	Chrysler	—Six	875	118	6.25/16	6-3½x4½	27.3	241.5	93-3400	6.00	41.5	Cl.	Ch.	Ala.	Pur.	Bur.	Car.	NS.	A.	Wil.	P.B&B.	Own.	Nb-UP.	½ Own.	LH.
17	Chrysler	DeLuxe	1045	121	6.50/16	8-3½x4½	33.8	273.8	105-3400	6.20	43.3	Cl.	Ch.	Ala.	Pur.	AC.	Str.	NS.	A.	Wil.	P.B&B.	Own.	Nb-UP.	½ Own.	LH.
18	Chrysler	Airflow 8	1345	123	7.00/16	8-3½x4½	33.8	323.5	115-3400	6.20	41.8	Cl.	Ch.	Ala.	Pur.	AC.	Str.	Bur.	A.	Wil.	P.B&B.	Own.	Nb-UP.	½ Own.	LH.
19	Chrysler	Air. Imp. 8	1475	128	7.50/16	8-3½x4½	33.8	323.5	130-3400	6.50	42.4	Cl.	Ch.	Ala.	Pur.	AC.	Str.	Bur.	A.	Wil.	P.B&B.	Otwg.	Nb-UP.	½ Own.	LH.
20	Chrysler	Af.Cus. Im. 8	137	128	7.50/16	8-3½x4½	33.8	323.5	130-3600	6.50	...	Al.	Ch.	Ala.	Pur.	AC.	Str.	Bur.	A.	Wil.	P.B&B.	Otwg.	Nb-UP.	½ Own.	LH.
21	Cord	810	1095	125	6.50/16	8-3½x4½	39.2	288.6	125-3500	6.50	...	Al.	Whit.	Al.	No.	AC.	Str.	Buf.	A.	USL.	P.Long.	Own.	...	Tu Own.	LH.
22	De Soto	Airstream 6	810	118	6.25/16	6-3½x4½	27.3	241.5	93-3400	6.00	(c)	Cl.	Ch.	Ala.	Pur.	Bur.	Car.	NS.	A.	Wil.	P.B&B.	Own.	Nb-UP.	½ Own.	LH.
23	De Soto	Airflow 6	1095	116	6.50/16	6-3½x4½	27.3	241.5	100-3400	6.50	36.5	Cl.	Ch.	Ala.	Pur.	AC.	Car.	NS.	A.	Wil.	P.B&B.	Own.	Nb-UP.	½ Own.	LH.
24	Dodge	—Six	735	116	6.00/16	6-3½x4½	25.3	217.8	87-3600	6.50	40.0	Cl.	Ch.	Ala.	Pur.	AC.	Str.	NS.	A.	Wil.	P.B&B.	Own.	Nb-UP.	½ Own.	LH.
25	Duesenberg	J	142-153½	142-153½	7.00/19	8-3½x4½	45.0	419.7	320-4200	5.20	...	Cl.	LB.	Al.	Pur.	Y.	Str.	D.	Exi.	dp.Long.	Own.	m-Spi.	½ Own.	PH.	
26	Ford	V8	580	112	6.00/16	8-3½x3½	30.0	221.0	85-3800	6.30	41.2	Al.	Gear.	Al.	No.	Yes.	Str.	Own.	O.	P.Os.	Own.	m-Own.	½ Own.	OM.	
27	Graham	85,37	...	111	5.25/17	6-3x4	21.6	169.6	70-3500	6.80	...	Al.	LB.	Als.	No.	Bur.	Mar.	Old.	D.	Wil.	P.Ill.	WG.	Nb-UP.	½ Spi.	OH.
28	Graham	95,37	...	116	6.00/16	6-3½x4	25.3	...	85-3300	6.70	...	Al.	LB.	Als.	No.	Bur.	Mar.	Old.	D.	Wil.	P-Long.	WG.	Nb-UP.	½ Spi.	OH.
29	Graham	S.C.115,37	...	116	6.00/16	6-3½x4	25.3	199.1	106-4000	6.70	...	Al.	LB.	Als.	Fam.	Bur.	Mar(s).	Old.	D.	Wil.	P-Long.	WG.	Nb-UP.	½ Spi.	OH.
30	Graham	S.C.120,37	...	120	6.25/16	6-3½x4½	25.3	217.8	116-4000	6.70	...	Al.	LB.	Als.	Fam.	Bur.	Mar(s).	Old.	D.	Wil.	P-Long.	WG.	Nb-UP.	½ Spi.	OH.
31	Hudson	6-63	785	120	6.00/16	6-3x5	21.6	212.0	93-3800	6.25	39.3	Cl.	Ge°.	Al.	No.	AC.	Car.	Old.	A.	Nat.	P.Own.	Own.	Nb-Spi.	½ Own.	BH.
32	Hudson	8, 45-6-7	830	120-127	6.25/16	8-3½x4½	28.8	250.4	113-3800	6.00	(d)	Cl.	Ge°.	Al.	No.	AC.	Car.	Old.	A.	Nat.	P.Own.	Own.	Nb-Spi.	½ Own.	BH.
33	Hupmobile	618-G	855	118	6.00/16	6-3½x4½	29.4	245.3	101-3600	5.75	45.4	Cl.	Mor.	Als.	No.	Bur.	Car.	Old.	A.	Wil.	P.B&B.	WG.	Nb-Spi.	½ Spi.	LH.
34	Hupmobile	621-N	1035	121	6.50/16	8-3½x4½	32.5	303.2	120-3500	5.80	47.3	Cl.	Mor.	Als.	No.	Bur.	Car.	Old.	A.	Wil.	P.Long.	WG.	Nb-UP.	½ Spi.	LH.
35	Lafayette	3610	675	113	6.00/16	6-3½x4½	25.3	217.7	83-3200	5.61	39.4	Cl.	Whit.	Als.	No.	AC.	Str.	A.	USL.	P.B&B.	Own.	Nb-UP.	½ Own.	BH.	
36	La Salle	36-50	1185	120	7.00/16	8-3x4½	28.8	248.0	105-3600	6.25	39.0	Cl.	Whit.	Al.	No.	AC.	Str.	Old.	D.	Del.	P.B&B.	Own.	Nb-Mec.	½ Own.	BH.
37	Lincoln	Zephyr	1275	122	7.00/16	12-2½x3½	36.3	267.3	110-3900	6.7	42.5	Al.	Gear.	St.	Yes.	Str.	Own.	O.	Own.	P.Os.	Own.	m-Own.	½ Own.	MO.	
38	Lincoln	V12	136-145	136-145	7.50/17	12-3½x4½	46.8	414.0	150-3400	6.38	41.5	Al.	Ch.	Ala.	Pur.	Yes.	Str.	Own.	A.	Exi.	P.Long.	Own.	FF Tim.	M.	
39	Nash	Ambassador	885	125	6.25/16	6-3½x4½	27.3	234.8	93-3400	5.70	36.8	Cl.	Whit.	Als.	Own.	AC.	Str.	A.	USL.	P.B&B.	Own.	Nb-Mec.	½ Own.	BH.	
40	Nash	Amb. Super 8	995	125	6.50/16	8-3½x4½	31.2	260.8	102-3400	5.25	36.5	Cl.	Ch.	Als.	Own.	AC.	Str.	A.	USL.	P.B&B.	Own.	Nb-Mec.	½ Own.	BH.	
41	Nash	400	740	117	6.00/16	6-3½x4½	27.3	234.8	90-3400	5.61	42.2	Cl.	Whit.	Als.	No.	AC.	Str.	A.	USL.	P.B&B.	Own.	Nb-UP.	½ Own.	BH.	
42	Oldsmobile	F36	795	115	6.50/16	6-3½x4½	26.3	213.3	90-3400	6.00	39.2	Cl.	Whit.	Ala.	No.	AC.	Car.	Hay.	D.	D.	P.B&B.	Own.	Nb-Mec.	½ Own.	BH.
43	Oldsmobile	L36	910	121	7.00/16	8-3½x4½	28.8	240.3	100-3400	6.20	40.2	Cl.	Whit.	Ala.	No.	AC.	Car.	Buf.	D.	D.	P.B&B.	Own.	Nb-Mec.	½ Own.	BH.
44	Packard	115C-37	...	115	6.50/16	6-3½x4½	28.3	237.0	100-3600	6.30	...	Cl.	Mor.	Als.	No.	AC.	CG.	D.	Wil.	P.	P.	Nb-Mec.	½ Own.	H.	
45	Packard	120C-37	...	120	7.00/16	8-3½x4½	33.8	282.0	120-3800	6.50	41.8	Al.	Mor.	Als.	No.	AC.	Str.	Old.	A.	PD.	P.	P.	Nb-Mec.	½ Own.	H.
46	Packard	1500, 1, 2-37	...	127-34-39	7.50/16	8-3½x5	32.5	320.0	135-3200	6.80	...	Al.	Mor.	Als.	No.	AC.	Str.	D.	PD.	P.	P.	Nb-UP.	½ Own.	H.	
47	Packard	1506-7-8-37	...	132-39-44	8.25/16	12-3½x4½	56.7	473.0	175-3200	6.40	...	Al.	Mor.	Als.	No.	AC.	Str.	D.	PD.	P.	P.	Nb-Spi.	½ Own.	BP.	
48	Pierce-Arrow	1601	3195	138-144	7.00/17	8-3½x4½	32.9	238.5	0150-3400	6.40	...	Al.	Whit.	Als.	Pur.	AC.	Str.	Buf.	DT.	Wil.	P.Long.</				

Tune-Up Specifications

Car Manufacturers and Supersede All Others Previously Published

Steering Gear Make	Compression Pressure at Cranking Speed (Lbs.)	Spark Plug	RINGS		VALVES						IGNITION						FRONT AXLE														
			Make and Type	No. and Width Oil	Piston Pin Diameter		Head Diameter and Seat Angle			Operating Tappet Clearance	Intake Valve Opens Before or After T.C.	No. of Degrees	No. of Flywheel Teeth	Breaker Points Gap (Ins.)	Spark Occurs °TC	No. of Flyw. Teeth Spark Occurs °TC	Breaker Housing	Rods Removed From	Crankpin Diameter (Ins.)	Crankpin Length (Ins.)	Capacity Crankcase (Quts.)	Capacity Cooling System (Quts.)	Caster (Degrees)	Camber (Degrees)	Toe-in (Inches)	King Pin Inclination (Degrees)	Line Number				
					Piston Pin Locked in	Inlet (Ins.)	Inlet Seat Angle (Degrees)	Exhaust (Ins.)	Exhaust Seat Angle (Degrees)																						
BH.	2-1/8	1-1/8	Ch-J-6	1-1/8	R.	1 1/8	30	1 1/8	45	.342	010H	.010H	.012	7 1/8	214A	110	.018	.025	3B...	1B...	Au	B	2 1/8	1 1/4	6	16	3 1/4-4	1.5	1/8	7 1/2	1
BH.	2-1/8	1-1/8	Ch-J-6	1-1/8	R.	1 1/8	30	1 1/8	45	.342	010H	.010H	.012	7 1/8	214A	110	.018	.025	3B...	1B...	Au	B	2 1/8	1 1/4	8	20	2-3	1.5	1/8	7 1/2	2
BH.	2-1/8	1-1/8	Ch-J-9	1-1/8	R.	1 1/8	30	1 1/8	45	.342	010H	.010H	.012	7 1/8	214A	110	.013	.025	3B...	1B...	Au	B	2 1/8	1 1/4	8	20	2-3	1.5	1/8	7 1/2	3
M.m.	2-1/8	1-1/8	Ch-C-7	2-1/8	R.	2-1/8	30	2-1/8	45	.003H	.004H	TC...	TC...	TC...	TC...	80	.020	.020	Re	...	1 1/8	1 1/4	4	6	5	1 1/4	1/8	1 1/4	4
OH.	2-1/8	2-1/8	AC-H9	2-1/8	R.	1 1/8	45	1 1/8	45	.371	.015	.015	.019	8B...	146	.015	.025	2B...	4B...	1A	2	1 1/4	6	13 1/4	3-3 1/4	-1/4-1 1/4	1 1/4-1 1/2	4	5		
OH.	2-1/8	2-1/8	AC-H9	2-1/8	R.	1 1/8	45	1 1/8	45	.371	.015	.015	.019	14B...	6B	.015	.025	10B...	4 1/2B...	2A	2	1 1/4	8	17	13 1/4-2 1/4	-1/4-1 1/4	1 1/4-1 1/2	4 1/2	6		
OH.	2-1/8	2-1/8	AC-H9	2-1/8	R.	1 1/8	45	1 1/8	45	.371	.015	.015	.019	14B...	6B	.015	.025	10B...	4 1/2B...	2A	2	1 1/4	8	17	13 1/4-2 1/4	-1/4-1 1/4	1 1/4-1 1/2	4 1/2	7		
OH.	2-1/8	2-1/8	AC-H9	2-1/8	R.	1 1/8	45	1 1/8	45	.371	.015	.015	.019	14B...	6B	.015	.025	10B...	4 1/2B...	2A	2	1 1/4	8	17	13 1/4-2 1/4	-1/4-1 1/4	1 1/4-1 1/2	4 1/2	8		
BH.	2-1/8	2-1/8	AC-K9	2-1/8	F.	1.87	45	1.62	45	.341	AA...	AA...	0	TC...	TC...	156	.015	.026	5B...	...	Ad	A	2.46	2 1/2	7	30	1 1/4-2	1/4-1	0-1/4	4 1/2 1/4	9
BH.	2-1/8	2-1/8	AC-K9	2-1/8	F.	1.87	45	1.62	45	.341	AA...	AA...	0	TC...	TC...	156	.015	.026	5B...	...	Ad	A	2.46	2 1/2	7	29	1 1/4-2	1/4-1/4	0-1/4	5 1/2 1/4	10
OP.	2-1/8	2-1/8	AC-G6	2-1/8	F.	1.51	45	1.39	45	.341	AA...	AA...	0	TC...	TC...	113	.021	.026	4B...	1 1/4B...	B	2 1/2	1 1/4	9	19	1 1/4-2	1/4-1/4	0-1/4	5 1/2 1/4	11	
OH.	2-1/8	2-1/8	AC-G6	2-1/8	F.	1.51	45	1.39	45	.341	AA...	AA...	0	TC...	TC...	113	.016	.026	4B...	1 1/4B...	B	2 1/2	1 1/4	10	24	1 1/4	1/4	1/8	4 1/2	12	
O.	112	AC-K11	2-1/8	1-1/8	R.	1 1/8	30	1 1/8	30	.006H	.013H	.006	9B...	3 1/2B...	118	.018	.032	5B...	1 1/2B...	A	2 1/8	1 1/2	5	15	3-3 1/2	1/4-1	1/4-1	1 1/2 1/4	13		
O.	112	AC-K11	2-1/8	1-1/8	R.	1 1/8	30	1 1/8	30	.006H	.013H	.006	9B...	3 1/2B...	118	.018	.032	5B...	1 1/2B...	A	2 1/8	1 1/2	5	15	2 1/2-3 1/2	1/4-1	1/4-1	1 1/2 1/4	14		
O.	112	AC-K11	2-1/8	1-1/8	R.	1 1/8	30	1 1/8	30	.006H	.013H	.006	9B...	3 1/2B...	118	.018	.032	5B...	1 1/2B...	A	2 1/8	1 1/2	5	15	2 1/2-3 1/2	1/4-1	1/4-1	1 1/2 1/4	15		
LH.	2-1/8	2-1/8	Ch-J-8	2-1/8	F.	1 1/8	45	1 1/8	45	.340	.006H	.008H	0.10	TC...	TC...	146	.020	.025	TC...	TC...	Au	A	2 1/8	1 1/4	6	19	1 1/4	1/4	1/8	9 1/2	16
LH.	2-1/8	2-1/8	Ch-J-8	2-1/8	F.	1 1/8	45	1 1/8	45	.340	.006H	.008H	0.11	2B...	146	.018	.025	TC...	TC...	Au	A	2 1/8	1 1/4	6	22	1 1/4	1/4	1/8	9 1/2	17	
LH.	2-1/8	2-1/8	Ch-J-8	2-1/8	F.	1 1/8	45	1 1/8	45	.340	.006H	.008H	0.11	2B...	146	.018	.025	TC...	TC...	Au	A	2 1/8	1 1/4	6	17	1 1/4	1/4	1/8	9 1/2	18	
LH.	2-1/8	2-1/8	Ch-H-10	2-1/8	F.	1 1/8	45	1 1/8	45	.340	.006H	.008H	0.11	2B...	146	.018	.025	5A...	2A...	Au	A	2 1/8	1 1/4	6	17	2	1/4	1/8	9 1/2	19	
LH.	2-1/8	2-1/8	Ch-H-10	2-1/8	F.	1 1/8	45	1 1/8	45	.340	.006H	.008H	0.11	2B...	146	.018	.025	5A...	2A...	Au	A	2 1/8	1 1/4	6	17	2	1/4	1/8	9 1/2	20	
LH.	2-1/8	2-1/8	Ch-J-9	2-1/8	F.	1 1/8	30	1 1/8	45	.342	.010H	.010H	0.12	7 1/8B...	146	.018	.025	3B...	...	Au	...	1 1/4	1 1/4	3	22	1 1/4	1/4	1/8	9 1/2	21	
LH.	2-1/8	2-1/8	Ch-J-8	2-1/8	F.	1 1/8	45	1 1/8	45	.340	.006H	.008H	0.10	TC...	TC...	146	.020	.025	TC...	TC...	Au	A	2 1/8	1 1/4	6	19	1 1/4	1/4	1/8	9 1/2	22
LH.	2-1/8	2-1/8	Ch-J-8	2-1/8	F.	1 1/8	45	1 1/8	45	.340	.006H	.008H	0.10	TC...	TC...	146	.020	.025	5A...	2A...	Au	A	2 1/8	1 1/4	6	22	1 1/4	1/4	1/8	9 1/2	23
LH.	2-1/8	2-1/8	Ch-J-8	2-1/8	F.	1 1/8	45	1 1/8	45	.340	.006H	.008H	0.11	6A...	2 1/2A...	146	.020	.025	4A...	...	Au	...	1 1/4	1 1/4	1	24	1 1/4	1/4	1/8	9 1/2	24
LH.	2-1/8	2-1/8	Ch-6M	2-1/8	F.	1 1/8	30	1 1/8	45	.015C	.025	6B...	2B...	119	.021	.025	1 1/2B*	...	Au	...	2 1/8	1 1/4	12	32	3	1	1/4	1/4	25		
M..	105	Ch-7	2-1/8	1-1/8	F.	1 1/8	45	1 1/8	45	%	.013C	.013C	...	3 1/2B...	3B...	112	.013	.025	4B...	1 1/2B...	A	2	1 1/8	5	22	7	3	4	1-1/8	26	
H.	Ch...	2-1/8	1-1/8	2-1/8	R.	1 1/8	30	1 1/8	45	45	A		
H.	Ch...	2-1/8	1-1/8	2-1/8	R.	1 1/8	30	1 1/8	45	45	A		
H.	Ch...	2-1/8	1-1/8	2-1/8	R.	1 1/8	30	1 1/8	45	45	A			
H.	Ch...	2-1/8	1-1/8	2-1/8	R.	1 1/8	30	1 1/8	45	45	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...
H.	Ch...	2-1/8	1-1/8	2-1/8	R.	1 1/8	30	1 1/8	45	45	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...
H.	Ch...	2-1/8	1-1/8	2-1/8	R.	1 1/8	30	1 1/8	45	45	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...
H.	Ch...	2-1/8	1-1/8	2-1/8	R.	1 1/8	30	1 1/8	45	45	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...
H.	Ch...	2-1/8	1-1/8	2-1/8	R.	1 1/8	30	1 1/8	45	45	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...
H.	Ch...	2-1/8	1-1/8	2-1/8	R.	1 1/8	30	1 1/8	45	45	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...
H.	Ch...	2-1/8	1-1/8	2-1/8	R.	1 1/8	30	1 1/8	45	45	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...
H.	Ch...	2-1/8	1-1/8	2-1/8	R.	1 1/8	30	1 1/8	45	45	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...
H.	Ch...	2-1/8	1-1/8	2-1/8	R.	1 1/8	30	1 1/8	45	45	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...
H.	Ch...	2-1/8	1-1/8	2-1/8	R.	1 1/8	30	1 1/8	45	45	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...

Graham For 1937

(Continued from page 23)

Fresh air is taken in at the oil filler and forced out through the vent pipe. The latter has a special copper-wool filter at the highest point in the riser, the riser being so arranged that any oil foam or condensation reaching that point will run back into the crankcase. Connecting rod oil hole drillings have been discontinued, and oil grooves have been eliminated in the cadmium-silver connecting rod bearings. Cylinder wall lubrication is controlled by a metered flow of oil through the cast barrel-type valve

lifters to an oil groove at the lower end of the piston skirt. This groove is provided with short vertical oil leads or grooves which register with port openings in the valve lifters only at timed intervals. The vertical grooves are found only on one side of the piston. On the opposite side there is a small drilled hole which serves as a vent for trapped air and consequently produces a flow of oil around the groove.

Pistons are Bohn auto-thermic type, elliptically ground, and plated with a tin-base bearing alloy. Four rings are used—two plain taper faced rings, one 85 oil control ring and one of the new X-90 damper rings. Larger, ven-

tilated generators with voltage regulations are found on the Supercharged models. Oil filters and oil bath air cleaners are standard. Champion type J-9, 14 mm. spark plugs are used; Willard batteries will be found on all models. The new twin-lever Ross steering gear is used on all supercharged models, and a new needle-bearing ball type universal joint made by Universal Products will be used on all models.

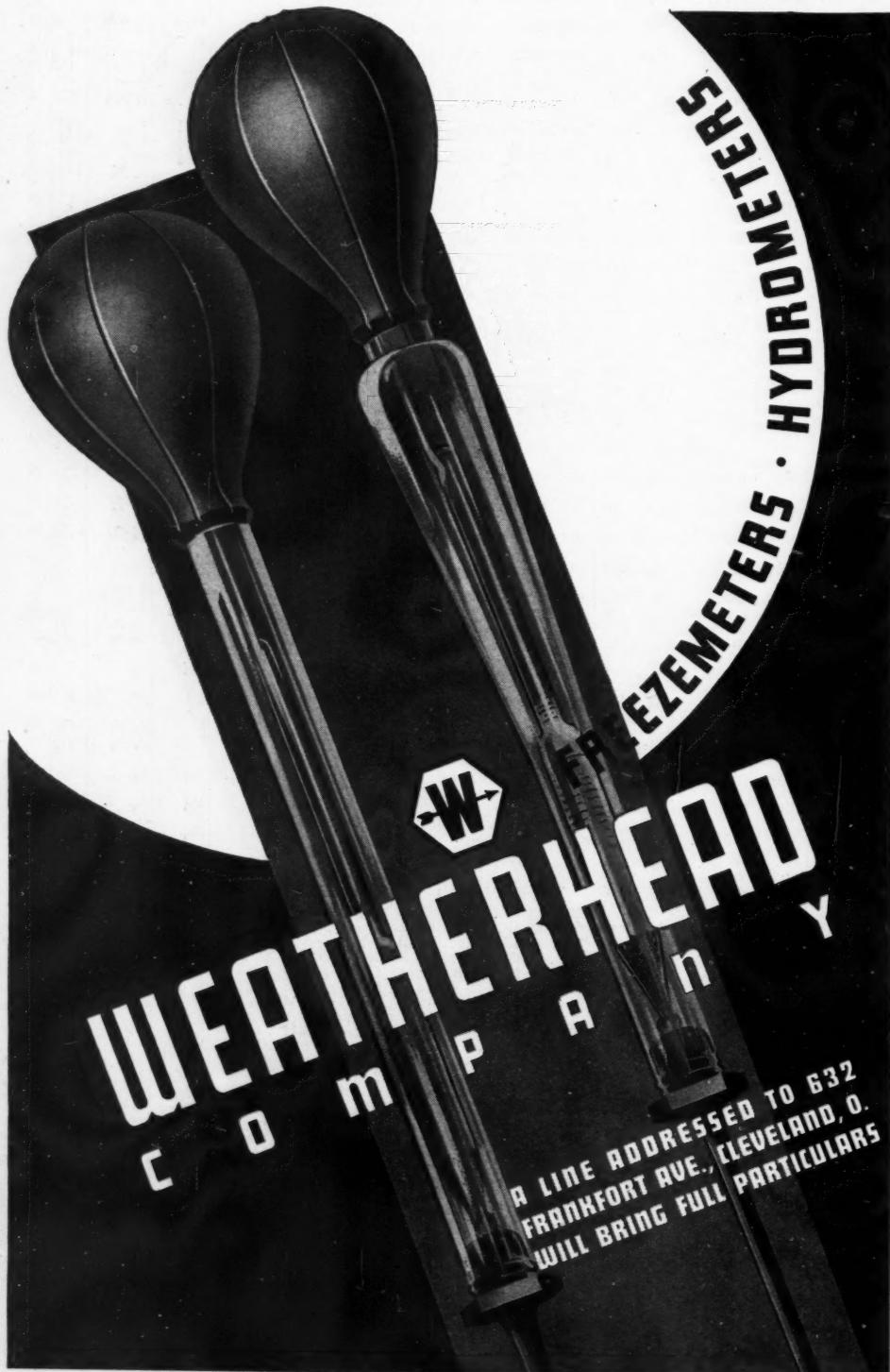
Overdrive is optional equipment on Cavalier and Supercharged models, and the spiral bevel rear axle is continued with standard gear ratio of 4.27 to 1; the optional ratio, which is standard with overdrive attachment, is 4.7 to 1. Hydraulic brakes are continued, with the parking brake lever located at the extreme left side under the instrument board and operating on a separate drum at the rear of the transmission, through a direct pull cable.

Hypoid Gears Are Here

(Continued from page 31)

some more "Extreme" than others, and it is vitally necessary for the fellow who buys the lubricant for your shop to know something about the desirable qualities of this type of lubricant. An "EP" lubricant is a gear oil to which extreme pressure ingredients, such as lead soap, chlorine or sulfur have been added. Because of the fact that these lubricants vary so widely in their characteristics when placed in the differential and subjected to every-day service, there is one "Don't" that must be kept in mind, and that is "DON'T MIX EXTREME PRESSURE LUBRICANTS"! While there are some "EP" lubricants which will work satisfactorily when mixed with others according to the manufacturers, it is pretty generally accepted that mixing "EP'S" is a dangerous practice. The reason for this is that when one lubricant having certain characteristics is mixed with a different brand which may have other characteristics, a chemical action takes place which is apt to have a corrosive effect on the metal of the gears or bearings through the formation of an acid which will attack the metal. Other combinations act to form a sludge, which, because of the heat developed, will cake to the inside of the housing and on the working parts. When a non-extreme pressure lubricant is mixed with an "EP," the only result is that the non-extreme pressure lubricant thins out at the higher temperature and simply performs no lubricating function, and the "EP" already in the housing does all the work. Since you have no way of knowing whether the lubricant which was made by John Smith will mix without injurious results with the lubricant made by Bill Jones, the only safe thing to do is to drain out the old lubricant and fill up with new. Bill Jones's lubricant may not be any better than John Smith's, and either one will be entirely satisfactory when used alone, but they may fight like two strange bulldogs when thrown together.

According to the oil companies, one of the most difficult problems they



have been faced with in recent years is the development of an Extreme Pressure lubricant that would meet all of the requirements of hypoid gears. The trend in automobile manufacturing during the past few years has been toward smaller wheels, smaller gears and increased speeds. This has resulted in greatly increased pressures on the gear teeth, which, coupled with the sliding action of the hypoid gear, has created a demand for a lubricant that would not squeeze out when subjected to this increased pressure, and would not wipe off under the worm action of the gears.

We hear a lot about engine operating temperature, and once in a while some problem comes up that makes us think of crankcase temperatures, but almost never have we had to think about the temperature of the differential. Yet this has been, and still is, one of the problems of the car manufacturer and particularly of the oil company. Differential temperatures range from below zero to as high as 250 deg. F., and this wide range has been the chief obstacle to the development of an Extreme Pressure lubricant. A lubricant of the proper viscosity for normal temperature would thin out so much at the higher temperatures that the film strength would be destroyed, and scoring of the gears would result. On the other hand, a lubricant that would retain its film strength at the higher temperatures would be so thick at the lower temperatures that the ring gear would cut a channel through it and the oil passages within the housing would become clogged so that parts of the unit would receive no lubrication.

Persistent effort on the part of the various oil companies has resulted in the development of an Extreme Pressure lubricant having a high viscosity index, or in other words one that is not too thick at low temperatures and yet retains its film strength at higher temperatures so that it will carry the extreme pressure ingredients satisfactorily and not allow them to separate from the oil. While the exact action of the materials in "EP" lubricants is not known, it is generally acknowledged that a chemical reaction takes place between the materials in the lubricant and the metal of the gears, resulting in a deposit of a load-carrying film on the teeth of the gears. This load-carrying film seems to be of a chemical rather than a petroleum nature, and serves to protect the metal from corrosion and wear. Without getting too technical on the subject of lubricants, let it suffice to say that this deposit of load-carrying film is the result of the chemical action of the "EP" ingredients in the lubricant and the metal of the gears when subjected to high temperatures, and is not found in lubricants that do not contain "EP" ingredients.

Therefore, the point to watch in the purchase of an Extreme Pressure lubricant is the viscosity index. The film is merely the carrying agent for the "EP" ingredients, and if the film breaks down the "EP" materials will not be carried in between the teeth of the gears where they can be deposited and be subjected to the chemical reaction of the metal. Some lubricants that appear to have the proper viscos-

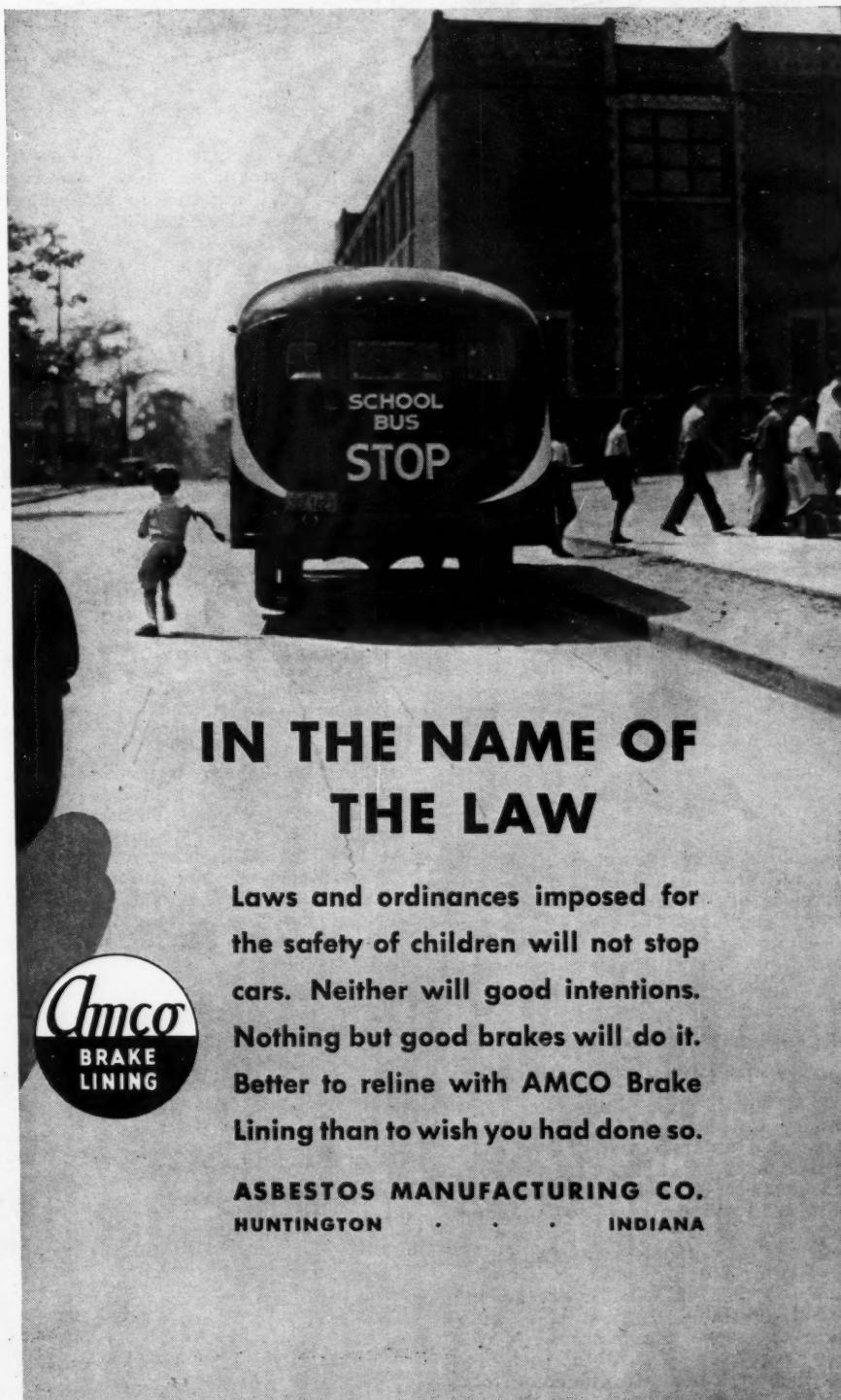
ity at a certain temperature may thin out so badly at a higher temperature as to be wholly unsuited for this type of lubrication. In other words, they have a low viscosity index.

Referring again to the adjustment of these gears it must be remembered that just because they are quiet does not necessarily mean that they are adjusted correctly. Due to the construction of this type of gear, quietness can be obtained throughout a wider range of adjustment than is possible with spiral bevel gears, but if the setting is not according to factory specifications, rapid wear will take place which will soon result in noisy operation.

Italian Grand Prix

Won by Auto Union

Driving a 16-cylinder 367 cu. in. Auto Union, Rosemeyer won the Italian Grand Prix, at Monza, the last important European race of the season, at an average of 84.1 m.p.h. The speed was artificially reduced by four "kinks" on the course. Tazio Nuvolari finished second on a 12-cylinder Alfa Romeo, two minutes behind the winner; Von Delius was third on Auto Union; Dreyfus and Pintacuda respectively fourth and fifth on Alfa Romeo, and Dusio sixth on Maserati.



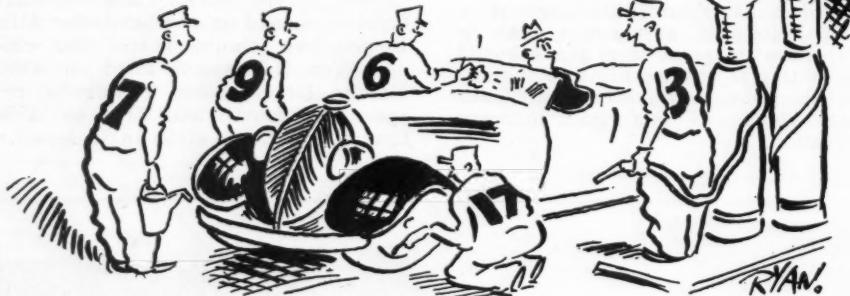
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THE LAW**

Laws and ordinances imposed for the safety of children will not stop cars. Neither will good intentions. Nothing but good brakes will do it. Better to reline with AMCO Brake Lining than to wish you had done so.

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HUNTINGTON INDIANA**

Amco
BRAKE LINING

"The boss used to be a football coach"



Defrosting Fan Operated By Flexible Shaft

The Fulton Co., Milwaukee, Wis., has announced a defrosting fan which is driven by a flexible shaft operated by the fan belt, requiring no electricity or vacuum. Easy action hand

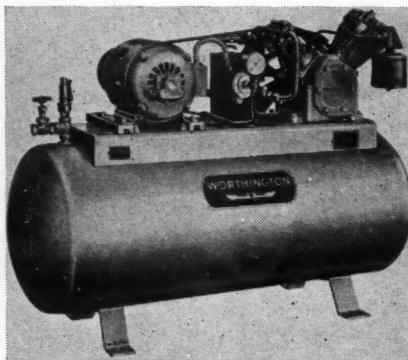


control provides regulation of speed, and universal ball joint permits adjustment of fan to any desired position. Priced at \$4.50 for 4 1/2 in. fan with chrome plated guard, and \$3.75 for 3 3/4 in. fan with mahogany guard.

Improved Air Compressor Presented by Worthington

The Worthington Pump and Machinery Corp., Harrison, N. J., has announced an improved line of compressor units for garages, repair shops and service stations. Single-stage units are available with vertical compressors. Motor sizes range from 1/4 to 5 hp., with displacement from 1.43 to 24 cubic feet per minute at maximum pressure of 150 lbs. per sq. in. Two-stage units are available with angle two-stage compressors. Motor sizes range from 1/4 to 10 hp. with displacements from 3.9 to 45 cubic feet per minute at maximum pressure of

200 lbs. per sq. in. Air pressure switch with a valve for unloading the compressor when starting or stopping is furnished on all models.



Studebaker Employment Mounts

According to Paul G. Hoffman, president, the Studebaker Corp. will be operating a double shift before spring next year. The plant now is turning out 400 cars a day and by the end of September expected to be producing 480 cars a day. The corporation has taken back 600 men during the two weeks of late September which brings the employment rolls up to approximately 7000 men, all of whom are former employees, some of whom have been on the inactive list for three to five years.

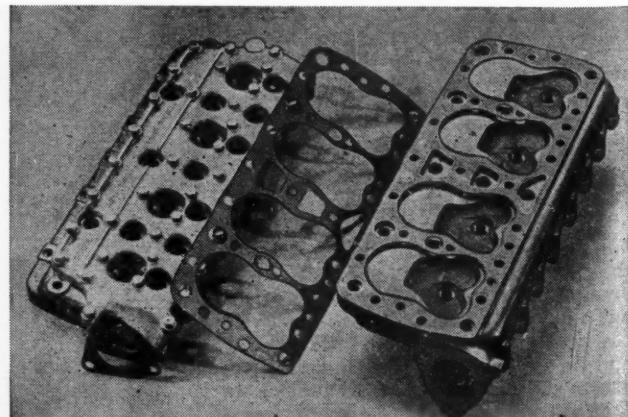
Bimetallic Cylinder Heads Made by Federal-Mogul

Federal-Mogul Corp., Detroit, is offering to owners of Ford V-8 cars and trucks a new type of cylinder head which is claimed to increase the power of the engine and its fuel economy. This head is made in two parts; the lower part, which forms the wall of the combustion chamber, is made of a heat-treated copper alloy called Thermo-Flow, said to combine great tensile strength with high heat conductivity. The upper part, which forms the jacket wall or cap, is normally made of aluminum for the sake of lightness, but in the case of marine engines, where the corrosive effect of salt water on aluminum may prove an objection, it can be made of cast iron. These two parts are held together by a special set of screws, and the joint need never be broken. The composite head is held in place on the cylinder block by the regular cylinder-head studs, but these pass through the lower part only. The Thermo-Flow alloy is claimed to have a heat conductivity two-and-one-half times that of aluminum and to make possible the use of still higher compression ratios.

Results of tests made with a Ford V-8 engine with cast iron, aluminum and Thermo-Flow heads respectively have been issued by the Federal-Mogul Corp. With the standard aluminum heads a compression ratio of 6.3 was used, and with the Thermo-Flow head a ratio of 7.75. No figure is given for the compression ratio used with the cast iron heads, but the measured compression pressures were 90, 112.6 and 134.2 lb. per sq. in. for the iron, aluminum and Thermo-Flow heads respectively. Horsepower curves show that the engine developed 84.5 hp. with cast iron, 91.5 hp. with aluminum, and 107 hp. with Thermo-Flow cylinder heads. An over-all reduction in fuel consumption of 10 per cent was found in the dynamometer tests, which extended over a wide speed range.

A comparative road test was made with a standard Ford tractor with trailer in service between Detroit and Buffalo, with cast iron and Thermo-Flow cylinder heads respectively. In 1500 miles of operation (two round trips) 262 gal. of gasoline were burned with the cast iron heads and 217 with the Thermo-Flow heads, which represents a saving of 19 per cent.

Federal - Mogul bimetallic type cylinder head





LIST
25c

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CRESCENT CABLE COMPANY
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WEIDENHOFF

Don't judge Weidenhoff Engine Tune-up equipment by other units which have been put on the market and sold as "similar to" or "as good as"—There is only one WEIDENHOFF—Originators of Engine Tune-up Equipment and Certified Engine Tune-up.

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New High-Speed DREDNAUT BUMPERJACK \$285 LIST

FASTER and EASIER to operate — more positive action — thoroughly adaptable to all overhanging "fronts" and "rears" of new cars. Simply lift sliding rest to bumper bar and pump the handle.

AUTO SPECIALTIES
MFG. COMPANY
ST. JOSEPH, MICHIGAN



Radio Interference

(Continued from page 35)

for a distance of from about one inch from the coil to the front side of the dash panel, with the shielding soldered to the front side of the dash. The principal point to remember throughout the installation of the set is to be sure that wherever a connection is made the paint and dirt should be scraped off so that a bright metal surface is available.

It is the general practice to install a condenser on the generator, connecting the lead to the output terminal. Care should be exercised to be sure that the terminal is not connected to the field terminal of the generator; such an installation would interfere with the voltage control unit. Many of the current model cars use a condenser connected to the negative side of the ammeter, and some connect a small condenser in the dome light wire. Car accessories sometimes interfere with radio reception, causing a hum, and in those cases small condensers have to be installed.

There are certain points that require special bonding on the various model cars, experience having shown that these additional connections are necessary to satisfactory radio reception. The 1936 Oldsmobile should have a ground strap installed from the left rear cylinder head bolt to the top of the starting pedal bracket, and another ground strap from the frame "X" member to the rear of the transmission. The metal pipes and cables that pass through the dash panel should be bonded to the front side of the dash. The steering column should also be bonded to the dash, and a ground strap installed from the muffler flange to the frame side rail.

Pontiac requires bonding of the pipes and cables leading through the dash panel, and also a ground from the torque tube to the frame cross member just to the rear of the tunnel in the "KY" member. The end pigtail of the antenna lead-in shield should be grounded to the left front antenna bracket. It is important that the paint be scraped off the bracket at the joint and also at the junction between the bracket and the running board.

A condenser is mounted on the Ford coil, the lead being connected to the low tension terminal on the left rear side of the coil. The generator condenser is attached to the generator cut-out mounting lug, with the lead connected to the battery terminal of the cut-out. An additional condenser is provided to remove interference from the dome light wire, and is mounted to the screw connecting the instrument panel to the pillar, the lead being connected to the bullet connector on the dome light wire at the entrance to the pillar. The electric oil and gas gages also require condensers, the oil gage condenser being mounted on the transmission housing underneath the starter wire clamp, with the lead connected to the terminal of the gage on the flywheel housing. The gas gage condenser is installed on top of the left side of the gas tank.

Nash Model 400 and the Lafayette for 1936 use a condenser on the gen-

(Continued on page 82)

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GRINDING WHEELS

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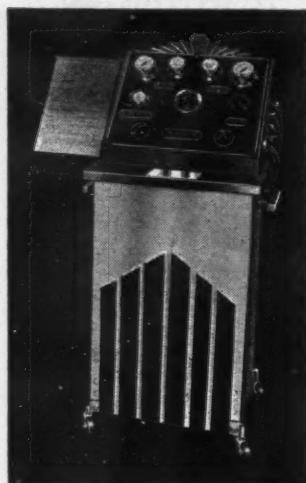
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A new and sensational tester engineered correctly.

Your jobber can deliver this tester to you under a surprisingly low price plan. See him at once.

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ZECOL, Inc., Milwaukee, Wis.

(Continued from page 81)

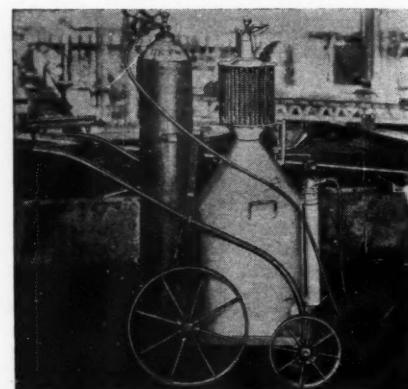
erator and on the dome light wire, and in addition suggest that the distributor rotor terminal be peened so that it comes within about .001 in. of the stationary electrodes of the distributor cap. The Ambassador models also use a condenser on the ammeter side of the ignition coil.

Chrysler, DeSoto, Dodge and Plymouth models follow the same general points outlined above, bonding the pipes and cables leading through the dash panel, installing a ground on the steering column and using condensers on the generator, dome light wire and ammeter.

The Studebaker President model uses a condenser on the ignition coil terminal of the switch, while Terraplane requires a condenser on the gas gage.

Acetylene Generator Made by Sight Feed

The Sight Feed Generator Co., Richmond, Ind., has announced a portable acetylene generator with a visible carbide supply, which enables the operator to know at all times exactly how much gas is available. Considerable saving is claimed in the cost of acetylene generated by the Sight Feed generator, as well as in the cost of the finished work.



YOU NEED THIS TOOL SAYS GEORGE!



Axle Rethreading Die
No. U-131

Attach to good part of thread and screw off end for a perfect new thread. Sturdily made of drop forgings. \$6.00.

NATIONAL MACHINE & TOOL CO.
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Complete Cushions with springs \$1.50 to \$2.00

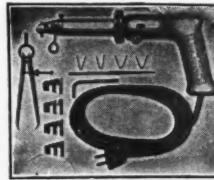
Cushions with cotton only 50¢ to \$1.00
Sewing Thread 16/4 Blk. good grade 55¢ lb.

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Fibre Boards 7¢ up
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A NEW LOW PRICED STEER - O - MASTER

A complete front end and wheel alignment service unit, all analytical and corrective equipment included, at a price that makes this type of service more profitable than ever. Write for details.

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SYNCHRONIZE FORD V8's
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Easily adjustable without deflating tire. Corrects shimmy, tramp and excessive tire wear. Never get loose on wheel. Easiest to install. Sold by leading jobbers. Investigate!



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Get your share of the big, easy profits Kwick-Kut equipment is providing for shops the country over. For as little as \$6.50 you can start in with a Kwick-Kut groover—the finest built.

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BRUSHES METAL GRAPHITE
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The experience of 25 years of carbon engineering available on request.

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New Type Universal Blade, fits all arms. Blade rolls in action, no bending of rubbers. 7-ply wiping features give 100% wiping, therefore, clear vision at all times.

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IT'S ALL DONE WITH

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Steady money is a sweet thing to have. You can have it the year around. Build up a steady line with the SINKO Lighter and Lighter Replacement Line.

Your jobber will be glad to serve you.

SINKO TOOL & MFG. CO.
351-371 N. Crawford Ave.
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America—The Land of the Common Man

(Continued from page 33)

for the wages the government says he can have. To strike is to be guilty of treason and the penalty is imprisonment or death.

He owns nothing that cannot be snatched away without recourse. His life is the property of the state subject to termination at the whim of those in power. He has no voice in government. Parliaments are abolished. If he votes at all he votes as he is ordered to vote or he goes to jail. He is not even free to think as he likes. He can't say what he thinks if it happens that his thoughts are not in accord with those of the men in high places.

One of the first acts of the leaders of either a Fascistic or Communistic government is to cancel the right of free speech. And yet, in a democracy, the thing which the advocates of either of these other forms of government most strongly demand is this same precious right which they would lose immediately if the system which they advocate were adopted unless they themselves, as they always hope, were the ones to come into power. In that case they would deny the right to everyone else.

Dissenting minorities have no place in either Fascism or Communism. They are snuffed out. They are suppressed not by ballots but by bullets. We have all seen many photographs of Germans and Italians, massed in thousands, every one with upraised arm. They are pictures of what may be mistaken for extraordinary unanimity of thought and purpose. But when we remember that an unraised arm may mean the end of life or, at least, a term in prison, the first impression disappears and we see instead a mass of slaves in political chains. The deadly fear of dictators is constantly gnawing at their hearts. They live forever suspicious of and suspected by those whom they would call their friends. They know always that at any time the pointing finger may be the sign of death. They therefore raise their arms. It is for such a life as this that the common man in Spain has killed his brother.

It was from Spain, four hundred and forty-four years ago, that Christopher Columbus, an Italian, sailed, backed by Spanish money, when he discovered America. He sought a shorter route to a source of material riches. What he discovered has proved to be an infinitely more valuable contribution to mankind. He discovered the land on which has grown the greatest opportunity for the common man that the world has ever known. At least it can be said that his discovery led other men to a land where they could be free if they had the courage for freedom. And it turned out that there were men who had that courage.

For more than one hundred and fifty years the United States of America has been the land of opportunity for the common man. It has been a land without king or dictator. It has been a land where men might safely

(Continued on page 84)

MARVEL

MYSTERY OIL

FOR

MOTOR TUNE-UP

Motors must be freed up and valve gums removed before adjusting.

MARVEL MYSTERY OIL frees motors rapidly, and produces continued improvement after treatment.

MOTOR BREAK-IN

Light oils are necessary for MOTOR BREAK-IN but are usually weak in film strength.

MARVEL MYSTERY OIL is ideal for breaking in motors. 20% added to a good S.A.E. 30 crank case oil produces a light oil which is much higher in film strength than heavy oils.



BEARINGS

Bearing metals and alloys, supersensitive to corrosion, are safe with **MARVEL MYSTERY OIL** as it will not affect metal.

This is important when breaking in motors or on mechanisms where a number of different metals are used.

SAFE and EASY TO USE

MARVEL MYSTERY OIL is easy to use, it is not inflammable, has a pleasant odor, and is harmless to the most sensitive skin.

MARVEL MYSTERY OIL has no light ends to evaporate and does not deteriorate in an open container.

Marvel Mystery Oil

Is a Vital Aid to Lubrication

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Gardiner Acid-Core Solder costs less and goes further than ordinary or "nameless" solders. Its uniform high quality guarantees neater, faster work... preferred by amateurs and

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Write for generous sample and mention the name of your jobber.

Other Gardiner products include bar, body and solid wire solders and babbitts.



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 For Higher Profits

30 Days to *Prove* it Pays
 "Simplified" ARC WELDING

Garages and repair shops the country over are earning from \$150 to \$300 extra profit each month with this new and modern 40-volt arc welding. Body and fender repairs, cracked motor blocks, frame repairs and hundreds of odd jobs are easily and profitably handled. Simplified control requires no unusual experience. Easy Pay-Out-of-Profit Terms. Write for details.

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 THE FASTEST SELLING WELDER
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VALVES, PISTONS

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TRYON SHACKLES

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ECCENTRIC and

RUBBEROD TIE RODS

OILITE BUSHINGS



Thompson Products

(Continued from page 83)

speak their thoughts and contend for their principles and ideals. It has been a land where individual ambition and enterprise have been bountifully rewarded. It has been a land in which the lowest have become the highest with benefit to all, where the poorest have become the richest while all got richer. It has been a land of strong men making their own way as they chose, so far as that is humanly possible. It has been a land of individual rights with sectional or states' rights limited and prescribed and national rights still further limited. By those limitations, the rights and privileges of the common man were safeguarded.

But now, it seems, there is a tendency for some Americans, under stress, to shed their self-reliance, to call on their government to do for them what their forefathers fought to get the right to do for themselves. A Texas newspaper has recently said, editorially, that we are in danger of becoming a nation of cry-babies. "It is nothing but the plain truth," says this publication in a strongly Democratic state, "that since the depression depths of 1932 and 1933 a spirit of what some persons would refer to as chronic bellyaching has been displayed on a scale that is nothing short of alarming."

The tradition of the United States of America is a "sturdy self-reliance." We have depended on ourselves and have done very well indeed measured by the standards of living in all other countries of the world. Now there is a disposition to quit, to get the government to do almost everything for us, to insure our jobs, to give us security, whatever security may be. There are those in high places today who, for reasons which we will let them explain, encourage this change in attitude. To yield to this momentary weakness would be fatal to our individual freedom and would imperil our best chances for the truest possible security. To encourage and abet this weakness is to be little less than traitorous.

Every additional responsibility that we place on government takes us one step farther from the American ideal and one step nearer to the All-Powerful State. Let Russia have its Communism, Italy its Fascism, Germany its Nazism, France its Socialism. Let Spain, after its murderous struggle, have whatever it may get, and Heaven help the common man. But let America always have its Democracy and its opportunity for all. Let it remain the land where the common man, as chances go, really has a chance.

16,000 Orders for New American Bantam Cars

Orders for 16,233 American Bantam automobiles have been received since the 1937 models were announced to dealers on September 15, by the American Bantam Car Company, Butler, Pa., according to R. S. Evans, president. These orders are sufficient to keep the plant on a 24-hour production schedule for four months, Evans stated.

Handy

BATTERY CHARGERS

Cost less to operate. Lower operating cost means MORE PROFIT for you. No. 12-B Wall type. 12 Battery size. Operates perfectly with any make 6-amp. rectifier bulb. Accurate ammeter. \$29.50 Price, without bulb.

WRITE for Bulletin on complete line of "HANDY" chargers, testers and racks.

BALDOR ELECTRIC CO.
 (Electrical Mfrs. for 16 years)
 4375 Duncan Ave., St. Louis, Mo.

Radiator, battery repairing and all sorts of soldering jobs easily done with the

TORIT Acetylene Torch No. 23

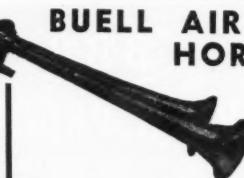


Simply connect to Presto Tank. Includes a set of 4 tips. Price, \$6.75.

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 290 Walnut St., St. Paul, Minn.

BUELL AIR HORNS

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STRONG
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Powerful Enough
 to Prevent Accidents
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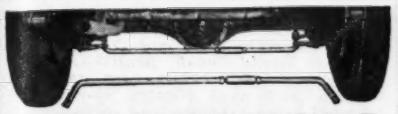
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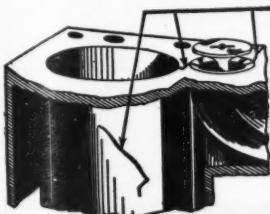
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RCA Radio Manual

The Service Division of the RCA Manufacturing Co., Camden, N. J., has prepared an automobile radio service manual which contains an elementary study of the automobile radio receiver, and the problems encountered during the installation of the set in the automobile.

Several diagrams illustrate the operation of interrupter and synchronous inverter types of vibrators, the circuits and systems, and the text matter thoroughly explains these points.

Considerable space is devoted to the installation of the set, and the elimination of interference. In addition to the standard methods employed, several suggestions covering additional interference prevention measures are given, along with a step by step procedure for determining by what path the interference is reaching the receiver.

The RCA Manufacturing Company invites radio service men to discuss their specific problems with them. Address all communications to Auto Radio Section, Service Division, RCA Manufacturing Co., Camden, N. J.

T. W. Putnam Made Chevrolet Product Service Engineer



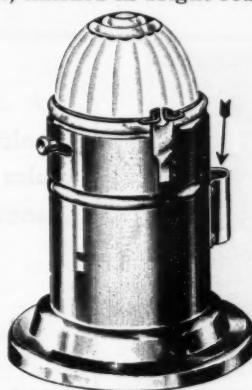
T. W. Putnam, who for some time has served as service and mechanical manager of Chevrolet's Detroit zone, has been appointed product service engineer of the Chevrolet Motor Co. He succeeds

H. H. Hicks, who has resigned.

Mr. Putnam has had many years' experience with Chevrolet.

Ecolite Electric Flares For Truck and Bus Signals

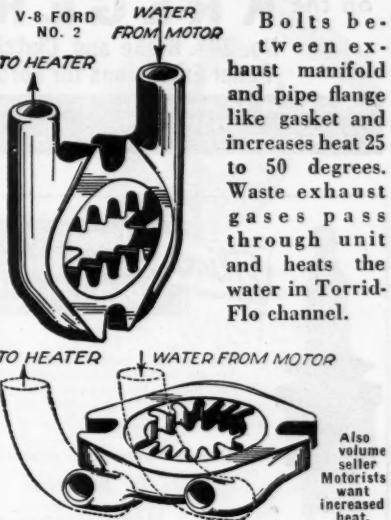
Economy Electric Lantern Co., Inc., Chicago, Ill., has announced an electric emergency flare which is said to have received the approval of the Underwriters' Laboratories after exhaustive tests on vibration, dust, water, visibility and reliability of mechanism. It is described as being constructed of all steel, finished in bright red enamel



with cadmium plated base, and uses standard six volt lantern battery. Has heavy ruby red lens and sliding wireless switch.

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Van Turner Joins Chek-Chart

The Chek-Chart Corp. of Chicago will publish the CHEXALL Accessory Blue Book which will list in tabular form, by makes and models, the manufacturers' specifications covering those items required for emergency replacement service which are known as "accessories."

In addition to the actual specifications, a great many pages will be devoted to the subjects of inspection, sales and installation of the accessories listed. The work of compiling and editing this material is being handled by Mr. Van Turner, who is experienced in compiling and editing parts information in books of a comparable nature.

Turner came to The Chek-Chart Corporation, as Editor of the CHEXALL Accessory Blue Book, with a background of experience as editor of the "Standard Service Manual," and previously as editor of the "Chilton Flat Rate Manual."

Engine Warmer Works Like Miner's Lamp



List price, \$4.95. Distributed by Lion Chain Co., 1301 S. Clinton Street, Chicago, Ill.

Bridgeport Thermostat Co., Inc., Bridgeport, Conn., has placed on the market a kerosene or coal oil burning "stove" for keeping motors warm in cold weather. Known as the Bunsen-Davy Motor Heater, the device is said to produce a Bunsen burner flame protected by a "Davy Screen" of the type used in miners' lamps to prevent explosions.

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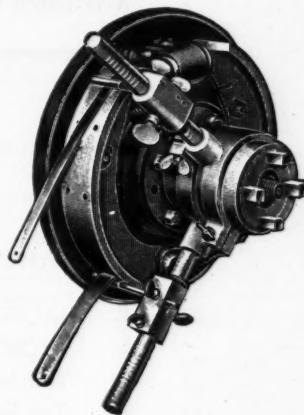
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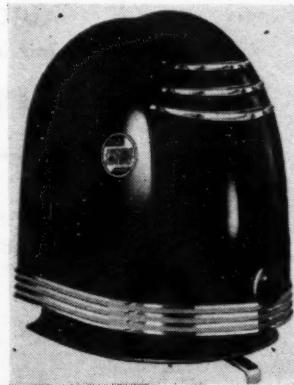
Wagner Electric Offers New Brake Micro-Gage

A Brake Micro-Gage designed to take the guesswork out of brake adjustments has been announced by the Automotive Parts Division of the Wagner Electric Corp., St. Louis, Mo. This precision tool is said to fit every passenger car and truck, and enables the mechanic to adjust the heel and toe of brake shoes at the same time. It is claimed to detect bent steering knuckles and bent axles, and to check taper, concentricity and out-of-roundness of brake drums, as well as determine the actual thickness of lining necessary. Model FL-120, illustrated is priced at \$18.80.



Gasoline-Burning Heater Announced by Stewart-Warner

Stewart-Warner Corp., Chicago, Ill., has announced a car heater which is independent of cooling system or engine temperatures. This new heater burns gasoline in a sealed chamber, under vacuum. The manufacturer claims that it is entirely new in design and principle, and that it has been approved by Underwriters' Laboratories, Inc. A push-button control turns the



heater on and off, and automatic controls are said to provide for every contingency. Suction from the intake manifold draws gasoline from the carburetor, and it is then mixed with air and ignited in a sealed combustion chamber, under vacuum, by a filament of electrically heated nichrome wire. The flame is drawn through passages in a cast radiator with copper fins, and all fumes are drawn to the intake manifold, where they pass out the motor exhaust. Thermostatic control operates the heater fan, which drives heated air downward and out the bottom of the heater.



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